



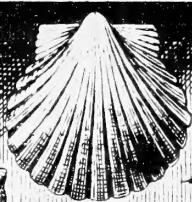
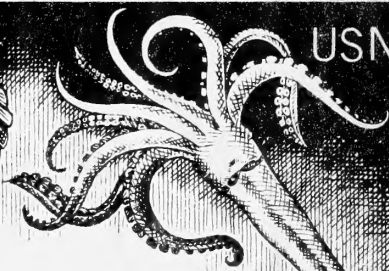
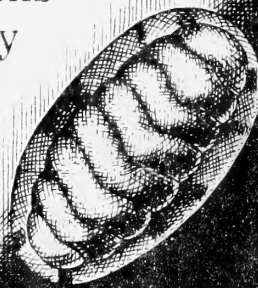
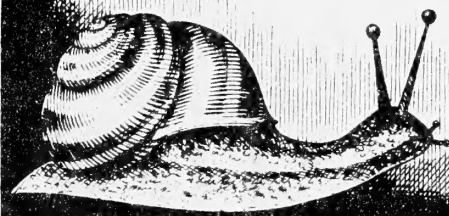
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**THE GENERA**  
OF  
**RECENT AND FOSSIL**  
**SHELLS,**  
**FOR THE USE OF STUDENTS**  
IN  
**Conchology and Geology :**  
**PLATES OF GENERA ;**  
**ALSO CORRESPONDING LETTER-PRESS,**  
**Descriptive of the Characters by which each Genus is distinguished.**  
**PARTICULARLY THE**  
**LAND, FRESH WATER & MARINE NATURE**  
**OF EACH GENUS,**

*As well as the Strata in which the Fossil Species occur.*

**ILLUSTRATED WITH**  
**264 ORIGINAL PLATES.**

**BY JAMES SOWERBY,**  
**F.L.S., M.G.S., &c.**

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**Vol. 1, Text.**

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**CONDUCTED BY**  
**GEORGE BRETTINGAM SOWERBY,**  
**F.L.S.**

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**LONDON :**  
**G. B. SOWERBY, REGENT STREET.**

**Price, Plain, 8 Guineas.**



# THE GLEANER

FOR THE YEAR 1841

BY JAMES BOWEN

IN TWO VOLUMES

Vol. I.

PLATE OF THE

PLATE OF THE

PLATE OF THE

LAND, FRESH WATER, AND

OF THE

the year 1841

PLATE OF THE

BY JAMES BOWEN

BY JAMES BOWEN

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GEORGE BRIDGEMAN BOWEN

THE

LONDON:

15, N. BOWEN, REGENT STREET.

Price, Plain, 3 Guineas.

## PROSPECTUS.

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**B**EFORE entering upon our subject, we feel ourselves called upon to explain the nature of the Work we propose to bring under Public notice, and in some measure to show its utility. In doing this we shall endeavour to be as brief as possible. As we have expressed ourselves in our Titlepage, our Work is to consist of Engravings illustrative of the **GENERIC CHARACTERS** of the several classes generally included under the common name, **SHELLS**; and it will include, with but few exceptions, all that *Linné* and Linneans receive under the term **Vermes TESTACEA**. It is not our intention to adopt implicitly either the System or the Genera of any Author who has previously written on Conchology, we certainly see great reasons for adopting many of the Genera lately established, and we are perfectly convinced that the immortal *Linné* would have done the same himself had he seen the very numerous subjects that have come under the notice of later writers, he would have found his own Genera inadequate, and have yielded to the force of necessity by establishing many new ones. Neither do we intend to enter into the investigation of the subject farther than is necessary for the purposes of usefulness; but we do not mean to confine ourselves to one or two observations where we think the subject either requires or deserves a more full elucidation. Nor can we observe any particular order in the publication of

## PROSPECTUS.

our Plates, but selecting the most characteristic specimens in illustration, we shall devote *One Plate (very rarely more)* to the elucidation of each Genus, and endeavouring as we proceed to ascertain the exact relation naturally existing between the various Genera, we shall give at the conclusion a Classification, arranged according to the more enlightened views we shall then have obtained.

The Plates of this Work will be *all* not only original, but executed in his best manner, by a person of generally acknowledged superiority of talent, by one who has already largely contributed by his labours to the advancement of Science in several branches of Natural History, a person whose entire labours for more than thirty years have been devoted to such useful and scientific objects: when we mention the name of

JAMES SOWERBY, F. L. S. M. G. S. &c.

we are sure the scientific Public will credit us for our intention to furnish it with correctly executed Engravings. Indeed, our whole Work will be original, though we have no objection to adopting the phrases and language of those who have preceded us; sometimes we shall gather information from them, and as far as we think they have done well we cannot do better than follow them, but never without examination; whenever we find them obscure or inadequate we will endeavour to explain and amend. Each of our Plates will be accompanied by a leaf, or more, of Letter-Press; in which we shall give a definition of each Genus and point out those characters in which it differs from others nearest in resemblance to it, and thus establish the relation between the Genera. To render this Work as useful as possible, we shall mention the Land, Fresh Water, and Marine Nature of each Genus; point out the Strata in which the fossil species occur, as far as we are acquainted with them by our own observation; and add such general remarks as may appear to us strikingly necessary in illustration



## PROSPECTUS.

of our subject. To avoid every thing like a critical examination of the works of our predecessors we shall, in all cases, content ourselves with barely mentioning any thing that occurs to us in the course of our publication that is absolutely incorrect.

So much for the nature of our Work: and while we propose the attainment of a *pleasing* and *scientific* object, we shall experience little difficulty in showing its utility; indeed this is so obvious and so generally acknowledged, that we may assume it without wasting our time in endeavouring to prove it,—we shall content ourselves with showing *how* and *to whom* we intend to render it useful.

1st, To the *Collector of Shells*, by making him acquainted with the distinguishing characters and relations of the subjects he collects; without which knowledge, Shells are a mere idle amusement that serves to gratify the eye without informing or improving the mind, and by the means of which they may be rendered both a pleasant and profitable amusement.

2dly, To the *Student in Conchology*, also by pointing out the nature of the objects whose acquaintance he wishes to cultivate, and enabling him to class them according to their several relations, and consequently to study them to advantage.

3dly, To the *Student in Geology*, because the characters of many formations, when considered without reference to the fossils they contain, are so variable that it is absolutely necessary for him to become acquainted with them, and with the Shells in particular, because they form so considerable a proportion of the Organic remains by which Strata may be identified and characterized.

We beg leave, in conclusion, to assure the Scientific Public of our intention to neglect nothing that is in our power to render our Work generally useful, and of our consequent willingness to profit by such

## PROSPECTUS.

information and observations as any kind Correspondents, who are also friends to Science, are willing to afford us; we shall feel ourselves obliged by such, and shall consider it our duty to acknowledge them with becoming gratitude, whenever we make use of them.

Feeling that the completion and consequent final success of our Work depends, in a great measure, upon the encouragement it receives at its commencement, we beg leave to assure those who become purchasers, that it shall be continued, and with the utmost regularity, until it is complete, whether it answer our expectations or not, *provided* only that the *actual expences* we may incur be paid by it without giving us any profit.



## ETHERIA.

—◆◆◆—  
*Lamarck.*—*Annales du Mus.* v. 10. t. 29—32.  
 —◆◆◆—

**TESTA** irregularis, inæquivalvis, adhærens, *umbonibus* brevissimis, basi testæ subimmersis. *Cardo* edentulus, undatus, subsinuosus, inæqualis. *Impressiones musculares* duæ, distantes, laterales, oblongæ. *Ligamentum* externum, contortum, intus partim penetrans.—*Lam.*

---

FIRST distinguished by Lamarck in the *Annales du Museum*. On account of its irregular form and foliated structure it might be mistaken for an *Ostrea*, but from that it may be distinguished by its having *two oblong muscular impressions*, in which character it approaches nearer to *Chama*; its hinge, however, is toothless; and has a strong, partly internal, *ligament*. Several species are described by Lamarck, all of which are found attached by the exterior of their lower valve to submarine rocks, and inasmuch as they conform to the irregularities of the place, cannot be strictly said to have any peculiar form, the *muscular impressions*, however, are lateral and rather distant. The beautiful pearly lustre of the substance of the shell in two species is much dwelt upon by Lamarck.

Two circumstances observable in the specimen of *Eth. semilunata*, drawn in our plate, would have induced us to suspect that this was a fresh water shell, or at least an inhabitant of æstuaries at the mouths of rivers; 1st, its having an epidermis, which remains only in those parts least exposed to the action of the water, the greater part, particularly of the upper valve, being eroded in a very irregular manner; and 2dly, its being partly covered with the remains of those ovate vesicular bodies, supposed to

## ETHERIA,

be the eggs of some molluscous animal, so frequently seen on fresh water shells; but Lamarck says that they are attached to the rocks at a considerable depth in the sea, on which account they are little known, having escaped the observation of collectors.

Lamarck mentions singular bubble shaped, unequal swellings in the interior, but which appear to him to be accidental; these are very conspicuous in the lower valve of the specimen from which our drawing is taken, we think they are caused by the accidental introduction of little parcels of sand over which the animal, to obviate the inconveniences their presence causes, has deposited a coat of shelly matter. He also speaks of an oblong callosity, which is as it were incrustated in the base of the shell without forming any internal projection.

Not known in a fossil state.

The specimen from which our plate is drawn is in the possession of the Rev. Dr. Goodall, Provost of Eton College, &c. We have represented the inside of both valves, and the outside of the upper one.



## PLACUNA.



**TESTA** bivalvis, libera, suborbicularis, subæquivalvis, complanata. *Cardo* interior, cicatriculis duabus, basi convergentibus, supernè divaricatis in valvâ inferiore; *costis* duabus elongatis, longitudine inæqualibus, minùs divaricatis in altera, *ligamento* præcipuè inservientibus. *Impressio muscularis* unica, simplex, suborbicularis.



EASILY distinguished from all other Genera by the two elongated, diverging *costæ*, or *laminæ*, of unequal length, to the external edges of which the *internal ligament* is attached, in the one valve; and by the two corresponding, but more divaricate, *impressions* in the other valve. All the species known to us at present, (which are not numerous), are extremely compressed, suborbicular, and nearly equivalve, the valve which has the two cardinal *costæ*, commonly called the upper valve, being rather less concave than the other. The valves are very thin, more or less transparent, of a foliated structure, composed of perpendicular fibres as in *Ostrea* and *Pinna*. A single, nearly circular, *muscular impression* is observable in the centre of each valve, with sometimes a minute lunulate, more lateral one and less frequently a third, very small, also lateral one placed at nearly the same distance on the other side of the principal muscular impression. A part of the *internal ligament*, which unites the two valves at the hinge, spreads on both sides the *umbo* in a transversely linear form, acutely dentated at its inner edge; this, on account of the imperfect state in which the specimens of this shell are generally brought to Europe, is very seldom observable. Slender, very obsolete striae, diverge from the *umbo* and cover the outside of both valves.

The recent species are inhabitants of the Indian seas: three are enumerated by Lamarck, of which the *Anomia*

## PLACUNA.

*Sella* of Linné, or Saddle oyster, and the *Anomia Placenta*, or Chinese Window Shell, are the best known and most easily distinguished. We have never seen any fossil species, but Lamarck describes one found near Metz, and figured in the *Encycl. Method.* t. 175, f. 1—4, from a specimen of this in our possession we judge it rather to be a *Plicatula*.

Fig. 1. Outside of the lower valve of *Pl. Placenta*.  
2. Inside of upper valve of the same.

## STRUTHIOLARIA.



*Lamarck.*—*Encycl. Method.* t. 431. f. 1.



**TESTA** oblonga, turrita ; *Aperturá* oblongâ, obliquâ, *labio externo* sinuoso, incrassato, revoluta, basi obliquè truncato ; *labio interno* incrassato, expanso, partem inferiorem anfractûs ultimi et columellam tegente.



AN oblong turritated *univalve*, with an obliquely placed oblong *aperture*, *outer lip* thickened and turned outward, with two sinuosities, one placed in an oblique direction, close to the base of the shell, and forming a sort of shallow canal, the other, rather above the centre of the lip, and less conspicuous ; *inner lip* thickened, spreading over the lower part of the last volution and the Columella.

By the above characters the shells of this Genus will easily be distinguished from those of *Buccinum* and *Murex*, the only two genera it could possibly be confounded with. The *Murex stramineus* of Gmel. may be considered as the Generic Type, which shell is however very distinct from *Murex*, and does not agree with Linné's character of that Genus.

Lamarck established the *Struthiolaria*: apparently only one species was known to him, it is what we have called *Struthiolaria straminea* in our plate ; had it not already been published under this specific name, we should gladly have adopted the more expressive one of *nodulosa*, by which Lamarck has designated it ; a second, which we have called *inermis*, has lately been added: both are from the coast of New Zealand. *S. inermis* may be distinguished from *S. stra-*

## STRUTHIOLARIA.

*minea*, or *nodulosa*, by its smaller size\*, and its wanting the rather pointed tubercles that surround the upper part of the volutions of *S. straminea*: its less sinuous outer lip, the greater depth of the spiral line, and the less angular upper part of the outer lip, also distinguish it.

The animal of this Genus is unknown: whether in its natural state the shell be covered with an epidermis or not, or whether it have an operculum we are unable to tell.

Not known in a fossil state.

Fig. 1 and 2. *Str. straminea*,  
3 and 4. — *inermis*,

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\* It may here be observed, that the comparative size cannot, in many cases, be considered as a good specific character; for we know that shells vary very much in size, even when full grown: here we think it may, for it is evident that the shells of this Genus do not complete the lip, nor form any varicose suture until the time of their adult state; consequently the smaller one cannot be taken for a young specimen, because it has already completed its sinuated revolute lip: and it has other distinguishing characters



# HIPPONYX.

De France.—Dict. des Sciences Nat. v. xxi. p. 185.

TESTA bivalvis, adhærens, inæquivalvis, æquilatera, *impressionem muscularem* in utrâque valvâ, formâ ferri equini, gerens; *valva inferior* affixa, compressa, margine plerumque elevato; *valva superior* patelliformis, subconica, vertice submarginali. *Cardo* edentulus. *Ligamentum* cardinis nullum.

WE are not surprized that Linné, and even later writers, should have inciuded the shells of this genus in *Patella*, having been acquainted only with the upper valve. De France is the first person who was able to prove that it was composed of two parts, though he still considers it as an *univalve*, which has the extraordinary property of making a *support*, for the purpose of raising itself above the shells or stones to which it is attached, founding his opinion upon what he conceives to be a difference in the nature of the two valves; the *upper one*, in his opinion, resembling in its structure the *Cypræa*, *Voluta*, and other similar shells, which he has observed sometimes disappear entirely in certain situations, where they occur in a fossil state, leaving only the cast of their interior, and the impression of their external parts; and the *lower valve*, he thinks, resembles in its structure the *Ostrea*, a Genus, the shell of which, he believes, never disappears in a fossil state. We cannot coincide with him in this opinion, for we see nothing in the nature of *Hipponyx* different from other bivalves; on the contrary, the numerous observations we have had in our power to make, appear to us only to strengthen the evidence in favour of the existence of a relation between this Genus and *Orbicula*, *Crania*, and *Terebratula*; and we suspect that the animal has, in common with those genera, two fringed arms or tentacula. In describing this Genus, we

## HIPPONYX.

are, therefore, obliged to consider it as an equilateral inequivalve, rather irregular *bivalve*; there is a muscular impression in each valve of the general form of a horse-shoe; the fibres of which this is composed are placed in a different direction from those composing the remainder of the shell, and appear to be more easily decomposed, for which reason there are frequently found fossil specimens with cavities in the place originally occupied by the muscular impression, particularly in the *lower valve*, which, in its general form, is orbicular, compressed, sometimes very much thickened, attached by its outer part to submarine bodies, its margin is for the most part elevated, more so in front than behind; its *muscular impression* can scarcely be called single, the two semilunar portions which compose it are placed close together; they are nearly confluent and narrow at the posterior part; more distant in front, where they are broader and rounder: it, however, has the general form of a horse-shoe. The *upper valve* is patelliform, subconical, sometimes very much compressed; its vertex or umbo is inclined backwards, and towards the posterior margin; like the attached valve it has an internal muscular impression in the shape of a horse-shoe, placed near the posterior margin, the two lobes of which are much more distant and obliquely truncated in front, but entirely confluent at the posterior part: there is a remarkable coincidence in the muscular impressions of this genus, with those of *Terrebratula*, which, in the lower valve, has two, placed near to each other, and in the upper valve a central one composed of two confluent portions. In *Hipponyx* there is no cardinal ligament, nor are there any teeth.

It was from the circumstance of observing a *cast* of the interior of the *upper patelliform valve* attached to a lower valve that De France began to suspect the true nature of this shell; his suspicions were afterwards confirmed by his finding the two valves together on the outside of a specimen of *Cerithium Cornucopia*; and also by the discovery of an attached valve of *Hipponyx mitratus*. About the same time we were almost persuaded of the same fact by an examination of the upper valve, and a comparison we instituted between it and some specimens of *Orbicula* and *Crania* which had just then fallen into our hands; we had not, however, the means of proving the truth of our surmise; but we have since met with several specimens of a small fossil species, the *Hipponyx lævis*, in the inside of other

## HIPponyx.

fossil shells from near Paris, which confirmed us in our opinion, and established the Genus. If any further evidence of the bivalve nature of the Hipponyx were necessary, it is abundantly supplied by a recent discovery of our esteemed and liberal friend C. De Gerville's, who had already enriched M. De France's and our own collections, with many specimens of the detached valves. In the latter part of the Summer of 1821, he met with several fine specimens with both valves together, and attached to *Cerithium Cornucopia*, at Hauteville, in the Department de la Manche; some of these he has obligingly forwarded to us; and had not our plate been already in the printer's hands, we should have availed ourselves of this opportunity, and have given a representation of one of them: if circumstances should hereafter render it necessary we shall give a new plate.

The only recent species that is certainly known to belong to the Genus Hipponyx, is the *Patella mitrata* of Linné, of which the attached valve is in M. De France's collection. The upper valves of several fossil species have been described by Lamarck, among his fossil *Patellæ*, under the specific names *Cornucopia* and *dilatata*; most of them are covered with striæ diverging from the *umbo* or *vertex*, and spreading to the edges all around; one is covered with strong costæ, diverging in a similar manner, and another is smooth. All the fossil species known are from the *Calcaire grossière* of the French, which, we think, is nearly, if not quite, identical with our London clay; though we are not aware of a single one having yet been found in England.

We cannot conclude this article without recommending to those, who have opportunities of collecting shells in a living state, to pay an increased attention to their nature and economy. It appears to us a strong proof of the general carelessness and inattention of collectors, that the true nature of so common a shell as *Patella mitrata* should so long have remained unknown, and that it should be, at length, discovered, not in the places where it is found abundantly, and where, consequently, the best opportunities were afforded, but by a person shut up in his study, at a distance from the sea-coast, and deprived of the means of observing it in its living state. There is reason to believe that several other recent species exist, but that only their upper valves

## HIPPONYX.

are known, because those who have picked them from their native rocks, have not taken the pains to observe in what manner they were attached.

- |  |   |
|--|---|
| Fig. 1. to 6. The upper valve of <i>Hipponyx Cornucopia</i> , in various stages of growth. | valves of <i>Hipponyx lævis</i> .   |
| Fig. 7. Outside of the lower valve.  | Fig. 11. 14. 15. Insides of the same valve of the same.   |
| Fig. 8. 9. Inside of the lower valve, in different states.                                 | Fig. 12. 16. Insides of lower valves of <i>Hipponyx lævis</i> , attached to portions of other shells. |
| Fig. 10. 13. Outsides of the upper   |   |

## TESTACELLUS.

—◆◆—  
*Cuvier.*—*Annales du Mus.* v. 5.  
 —◆◆—

**TESTA** univalvis, subcochleariformis, *spirâ* brevissimâ ; *apertura* oblonga, amplissima, supernè emarginata ; *labium externum* integrum, *internum* incrassatum, revolutum : *Impressio muscularis* transversa, lunulatim oblonga, in parte inferiore testæ posita.

---

A Genus rendered so extremely interesting, when considered in connection with the animal which produces it, that we could not resist a favourable opportunity afforded us of giving representations of the living animals of two species, though we do not intend to pledge ourselves, and we are sensible it will not be in our power to do this often. We shall not attempt a description of this singular animal, already so well described by *De Ferussac*, in his superb work on the *Mollusques terrestres et fluviatiles*, p. 88. our plate will give a very good general idea of its form and structure ; nor shall we enter into the detail of its history, it is sufficient to observe that it was first noticed by Dugué, in a garden at Dieppe, in 1740, but that it had scarcely engaged the attention of Naturalists until a few years ago, when Maugé brought some specimens from the Island of Teneriffe ; since which, it has also been found in several parts of France, and in Spain, and more lately in a garden at Bristol.

Some specimens from the last mentioned place have been handed to us by Mr. Miller\* of that City. It feeds upon earth-worms, having the power of elongating its body to such a degree that it is able to follow them in all their subterranean windings : we have observed them attentively, and were rather surprized that an animal generally so extremely sluggish in its motions, after discovering its prey, by means of its tentacula, thrusting from its large mouth its white crenulated revolute tongue, should instantly seize upon with extraordinary rapidity, and firmly retain an

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\* Author of a very useful and elaborate Monograph on the "CRINOIDEA."

## TESTACELLUS.

earth-worm of much greater size and apparent force than itself, but which, by its utmost exertion is unable to escape. *De Ferussac* and *Cuvier* consider this as the only carnivorous terrestrial mollusea. The animal bears a general resemblance to a slug; it carries its small shell on its posterior extremity. The shell is compressed, spoonshaped, with a very short spiral apex, its aperture is very large, oblong, slightly notched at the upper or posterior part; the outer lip is entire, the inner lip (called, by *De Ferussac*, the *clavicle*) is generally thickened and revolute. There is a transverse, oblong, lunulate muscular impression in the lower part of the aperture, which we suppose serves as a point of attachment between the shell and the animal. The outside of the shell is covered with a thin, horny, commonly olive green, epidermis, and is marked by the lines of growth.

Only two species of this singular Genus have been hitherto described, (for we cannot consider *De Ferussac*'s *T. ambiguus* as one, inasmuch as it has every appearance of being an internal shell) one of which, *haliotideus* of *De Ferussac*, is not uncommon in France; and the other, the *Maugei* of the same author, is a native of Teneriffe, but naturalized in a garden at Bristol: a third was lately discovered, by Mr. Sowerby, in a garden at Lambeth, it may therefore be considered as a native of this Island. We have named it *T. Scutulum*, and shall endeavour below to point out the characters of all three.

1. *T. haliotideus*, testa ovata, postice acuminata; clavícula lata et plana.—*De Ferussac*, vol. i. p. 94. t. viii. f. 5 to 9.
2. *T. Maugei*, testa ovato-elongata, spira elevatiuscula; clavícula angusta, rotundata.—*De Ferussac*, vol. i. p. 94. t. viii. f. 10. 12.
3. *T. Scutulum*, testa ovata anticè paulùm acuminata, extus plana, clavícula arcuata, elevata.—*Tab. nost.* f. 3 to 6.

*Obs.*—The animal of this species, bears a near resemblance to that of *T. haliotideus*, not having the double row of tubercles running from the head to the anterior part of the shell, so conspicuous in that of *T. Maugei*.

Fig. 1. Outside of the shell of *T. haliotideus*.

Fig. 2. Inside of the same.

Fig. 3. Front view of the animal of *T. Scutulum*.

Fig. 4. View of the same animal when extended.

Fig. 5. Outside of the shell of *T. Scutulum*, magnified.

Fig. 6. Inside of the same, also magnified.

Fig. 7. The animal of *T. Maugei* contracted.

Fig. 8. The same extended.

Fig. 9. Outside of the shell of *T. Maugei*.

Fig. 10. Inside of the same.

## LINGULA.

—◆◆◆—  
*Cuvier.*—*Annales du Mus.* v. i. p. 69.  
—◆◆◆—

TESTA bivalvis, subæquivalvis, æquilatera, ovato-oblonga, *apice* truncata vel subtruncata, paulum hians, *basi* subacuta. *Impressiones musculares* in utrâque valvâ duæ. *Ligamentum* nullum. *Cardo* edentulus.

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PERSUADED as we are that a correct knowledge of the nature of shells is only to be obtained from the examination and study of the animals which produce them, in a living state, we only yield to the absolute general impossibility of obtaining the living animals, and the consequent necessity of defining our Genera in such a manner that they may be recognized without that knowledge; and therefore in our Generic Character we have avoided taking any notice of those accessory circumstances in this Genus, which at once render it so interesting and apparently so anomalous.

The general form of this shell, when the *two valves* are closed, is an oblong oval, compressed, and much resembling a duck's-bill, they are attached to each other by the internal muscles, being suspended to a cylindrical, fleshy, tendinous peduncle. The two valves are equilateral, ovately oblong, truncate or subtruncate, and slightly gaping at their apices and pointed at their base, but somewhat different in their interior construction, one of them having a projection between the two muscular impressions elongated in the same direction as the shell, of which the other valve is destitute, as well as of shelly matter at the point of the base. The *muscular impressions* are oblong, placed near to each other and to the centre of the shells. A shining, horny *epidermis* coats both valves. There are no



## LINGULA.

cardinal teeth, nor are the two valves in anywise attached to each other when destitute of their animal inhabitant and of the fleshy peduncle.

Only one *recent* species of this Genus is known, it is the *Patella Unguis* of Linné,\* and *Lingula anatina* of Cuvier—it is of a green colour, its apex is truncated and somewhat trilobate; according to Lamarck it is found among the Molucca Islands. Several *fossil* species are described and figured in *Sowerby's Mineral Conchology*, tab. 19; one is not unfrequent in the *sandy indurated marle* of Bognor, identified by many of its fossils with the *London Clay*; another is found in a dark coloured Limestone belonging to the Coal measures (according to Mr. Farey), in the County of Durham; and a third has been met with in stones which appear to be the debris of Chalk Marle in Alluvium, in Suffolk.

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\* It is unnecessary for us to enter into the history of the misapprehensions of Conchologists on this singular shell; suffice it to mention that some, who, like Linné, had probably only seen a single valve, had considered it to be an operculum. Solander, and others, named it *Mytilus Lingua* and *Rosttrum*; Chemnitz calls it *Pinna Unguis*; and Seba, who has represented the two valves and its peduncle, took it for a *Concha anatifera* or pedunculate *Lepas* (*Anatifa* of Leach). Cuvier appears rightly to conclude, that Seba's error contributed to this confusion; but there are several points of resemblance, such as the fleshy peduncle and the ciliated arms of the *Lingula*, which very well account for Seba's mistake: the penetration of a CUVIER was requisite to determine the true nature of the animal, and assign to it its proper place in the system.



## OVULA.



*Lam.*—Syst. des Anim. sans vertebr. p. 72.



TESTA ovata, gibbosa, spirâ occultâ. *Apertura* longitudinalis, elongata, supra coarctata, subtus expansa, *apice basique* emarginatis et in canales plus minusve productis, *Labio interno* edentulo, *externo* involuto, interdum denticulato.

It is well known that the Linnean Genus *Bulla* consists of an assemblage of shells of the most various characters, and seems rather to have been formed by adding together the rejectamenta from other Genera, than from the consideration of their possessing any characters in common with each other, if we except that of their general gibbosity. The *Ovulæ*, for instance, whose characters bring them so much nearer to the *Cyprææ*, that they might have been added to them without doing half so much violence to nature, grouped with shells which have only a *single canal*, such as the *Pyrulæ*, with others which have no canal at all, such as the *Bulimi*, and *Achatinæ*, with some which are capable of containing entirely their animal inhabitant, and with others which are as entirely inclosed in the mantle of the animal, in fine we find the *Ovulæ*, which are marine, grouped by Linné, with both land and fresh-water shells, as with the *Bulimi* and *Physæ*. It was difficult to avoid this extreme of jumbling together shells of such diverse characters, without running into another extreme of constituting a Genus for almost every species which Lamarck included under his *Ovula*; this is what Montfort has done, whose Genera *Radius*, *Ovulus*, *Calpurnus* and *Ultimus*, are only so many dismemberments of Lamarck's *Ovula*. In order that this subject might be placed in a clear point of view before our readers, we have thought it advisable to give two plates,

## OVULA.

in which we have included five species, all agreeing in certain characters, which we have considered as the generic characters: we shall first detail these, and then enter a little more particularly into the peculiar distinctive characters of the five species we have drawn. In their general form the shells of this Genus are more or less ovate, and gibbous, their *spires* are always hidden; for their *convolution* is horizontal, the *whorls* never descending as they increase, but always preserving the same plane. Their *aperture* is longitudinal, elongated, narrow at its upper part, and more expanded below; both the *superior* and *inferior extremities* are notched, and each of them produced into a *canal*: the *inner lip* is smooth, without teeth or any kind of denticulation; and the *outer lip* is thickened and mostly turned inwards. The various length of the canals in the several species, added to the presence or absence of denticulation on the inner part of the outer lip, are the characters upon which Montfort has founded the distinctions between his four genera.

Several species of the Genus *Ovula* are known, one of the most common is the *Ovula oviformis* of *Lam.*: the *Bulla Ovum* of *Linn.* it is an egg-shaped shell, very white and smooth on the outside, its canals are both short, and the inner part of the outer lip is furnished with blunt denticulations, and when full grown it is coloured within of a more or less dark and rich brown: in its young state its outer lip is not involute nor denticulated, the outside is covered with fine transverse striæ, and it is colourless. We see no reason for altering its specific denomination, and therefore with Montfort have called it *Ovula Ovum*.

The *Ovula Volva* (*Bulla Volva* *Linn.*) is remarkable for the great length of the canals—of these the upper one is rather the longer, and the lower one is turned a little backward; the outer lip in this species is considerably thickened, but it is not so perfectly involute as in the other species. The outside of the body of this shell, when in good condition, is covered with transverse *impressed* striæ; these diverge as they approach the lip, and become oblique towards the canals on which they gradually increase so much in breadth as rather to form the spaces between oblique *raised* lines, than to deserve the appellation of *impressed* striæ. This is the *Weavers' Shuttle* of the English Collectors; when perfect and fine it is held in considerable estimation by them.

## OVULA.

The *Ovula birostris* (*Bulla birostris*, auctor.) is of an oblong shape, its superior canal is rather elongated and pointed at the apex; the upper part of its aperture is narrow, and the lower part proportionably wider than in other species: its inferior canal appears also to be pointed.

The *Ovula gibbosa* (*Bulla gibbosa*, Linn.) is of an oblong shape, it has near the middle of the back a distinct, obtuse, transverse ridge, and its canals are extremely short.

A fifth species, of which we have given a representation, is the *Ovula verrucosa*, (*Bulla verrucosa*, Linn.) this is perhaps the most remarkable; it is oblong, the back is elevated into an obtuse ridge, and finely striated; its outer lip is distinctly and regularly denticulated, but its chief peculiarity consists in having an orbicular shelly tubercle on the outer part at each extremity, exactly opposite to the canals; from these it has received its specific name.

Seven other recent species of this Genus are described by Lamarck in the 16th vol. of the Ann. du Museum, but as it would be going too far beyond our immediate object to describe all the species, we shall be content with mentioning particularly the *O. costellata* of Lam. which is the same as the *Bulla imperialis* of English Authors; a very pretty shell, and deservedly valued by Collectors.

Two fossil species are also noticed by Lamarck, both from one of more recent formations, and found at Plaisance.

The animal of this Genus is unknown to us, but as all the species when they have arrived at their adult state are more or less covered with a shining enamel-like shelly coat, evidently deposited after the formation of the outer involute lip, we have reason to believe that its bipartite mantle is capable of extension at pleasure, over almost the whole of the outer part of the shell, nearly in the same manner as in *Cypræa*. The knowledge of the animal may, at some future period, evince the propriety of separating the shells here included in *Ovula*, into several genera; until that period arrive, we think it more for the interest of Science to keep them united; and the more so, as we are quite certain, from the characters of the shells, that there must be considerable resemblance in those characters and habits by which the animals will be distinguished.

We cannot consider the English *Bulla patula* to be an *Ovula*.

The first of the month was a very cold day, with a heavy frost. The wind was from the north, and the snow was very deep. The people were all dressed in their winter clothes, and the children were playing in the snow. The day was very quiet, and the people were all at home.

The second of the month was a very cold day, with a heavy frost. The wind was from the north, and the snow was very deep. The people were all dressed in their winter clothes, and the children were playing in the snow. The day was very quiet, and the people were all at home.

The third of the month was a very cold day, with a heavy frost. The wind was from the north, and the snow was very deep. The people were all dressed in their winter clothes, and the children were playing in the snow. The day was very quiet, and the people were all at home.

## TURBINELLUS.



*Lam.*—Syst. des Anim. sans Vert. p. 83.



**TESTA** turbinata, *apertura* angusta, basi canaliculata; *Columella* 3- ad 5-plicata; plicis compressis, transversis.



A Genus approaching very nearly in its general characters to *Murex*; some of the species which constitute it have been placed by *Linné* among his *Murices*; others on account of the plicated *Columella* he has arranged among the *Volutæ*. We apprehend the *Murex Scolymus*, *Voluta Pyrum*, *Voluta Ceramica*, *Voluta Turbinellus*, and *Voluta Capitellum* constitute together a very natural Genus, to which Lamarck has given the Generic appellation of *Turbinellus*. They are turbate shells with a rather narrow aperture, elongated at its base into the form of a more or less lengthened canal: from three to five prominent, compressed transverse folds, all nearly equal in size, are placed near the centre of the *Columella*; these distinguish the shells of this Genus from *Murex*, with which, however, they agree in having an operculum, which with the canal at the base of the aperture separate them from *Voluta*. The several species which we have seen are covered with a thickish horny epidermis.

The *Turbinellus Pyrum* (*Voluta Pyrum* Linn.) from which our engraving is taken, has the upper part of its volutions furnished with a few rather distant, not very prominent tubercles, but some other species are covered with several rows of very regular, rather close set, prominent tubercles.

In some of the species of this Genus a singular fact may be observed, which seems to prove that the plicæ on the *Columella* are of considerable importance to the animal inhabitant, and that some of the animals of the univalves

## TURBINELLUS.

have the power of eroding or abrading or absorbing the calcareous matter which they have deposited in forming their shells, when they have no further use for it: for three rows of tubercles from the lower part of the whorl are gradually destroyed as the animal increases its inner lip, and in their place are formed the folds of the Columella.

The *Turbinelli* are marine. We are not aware that any have yet been found fossil, though they might be expected in the marine strata above the chalk.

## PANDORA.

Lam.—Syst. des Anim. sans vert. p. 136.

TESTA transversa, inæquivalvis, inæquilatera, latere antico longiore; regularis, libera. *Valva altera* plana, margine antico deflexo, *dente* unico, oblongo, obtuso, postico, *altera* concava, edentula. *Ligamentum cardinis* internum, cicatriculæ elongatæ in utrâque valvâ affixum. *Impressiones musculares* in utrâque valvâ duæ, distantes, laterales.

SHELL transversely oblong, inequivalve, regular, not attached, inequilateral, the anterior side longer and slightly gaping at its extremity; *one valve*, called by Lamarck the *upper valve*, flat, its anterior margin turned downward, with a *single*, oblong, obtuse *hinge-tooth* placed behind the ligament; the *other valve* concave, without any tooth, but an indistinct cicatrice, against which the tooth of the flat valve lies when the valves are closed. *Cardinal ligament* internal, fixed in each valve to an elongated cicatrice, which is inclined toward the anterior side of the shell.—Two distant lateral *muscular impressions* in each valve.

It will soon be perceived that we differ very materially from Lamarck in the number of teeth attributed to this Genus. Our regard to truth obliges us to do so; and much as we lament the necessity we are thus placed under, we can assure our readers that we have not done it without a strict examination of a number of specimens, for which we are indebted to the friendship of C. De Gerville, and also that we find the characters constant in three species.

The *Tellina inæquivalvis* of Linné is the type of this Genus, it is the *Pandora margaritacea* of Lam. in his *Système*, but, without giving any reason, he has altered its specific name to *rostrata* in his *Histoire Naturelle*; wherefore we retain the former name.

## PANDORA.

Two species are described by Lamarck, one of which, the *margaritacea*, or *rostrata*, is frequently found on the shore at Granville, and on the coast of Guernsey; the *obtusa* is found at Weymouth, and in Plymouth Sound; it has been long ago figured by Pennant, as a new and singular *Mytilus*, found at Weymouth. Mr. G. Humphrey has furnished us with a third *recent* species from the East Indies, we have named this *P. flexuosa*, and on account of a peculiarity in its internal structure, we think it deserving of a more particular notice: in this species the internal ligament is no longer attached on the *flat valve* to a mere cicatrice, but the part which bears it is produced into the form of an elongated *lamina*, diverging from the *umbo* towards the anterior side of the shell, and reaching nearly to the inner side of the anterior muscular impression, and to the edge of this the principal part of the ligament in this species is fixed: but in all the species of this Genus, this ligament might properly be said to be divided into two portions; the first, and generally the larger to the cicatrices in both valves, and to the anterior part, close to the *umbo*, of the tooth in the flat valve; the second, and the smaller in two species, attached in the flat valve near to the anterior side of the cicatrice, and in the concave valve to the anterior edge close to the *umbo*: in the *P. flexuosa*, this second part of the ligament is much the larger, and is attached as above described to an elongated lamina. Had Lamarck described this species, we should not have been surprized at his saying it had two teeth, but neither of those he has described are possessed of this lamina.

We do not know a single instance of its having been found in a fossil state. Of its relations we are unable to decide; Lamarck seems to us to have judged rightly in placing it near to *Corbula*, but as he has erroneously given it *two diverging teeth* in the flat valve, his observation, that "by their hinge the *Pandoræ* seems to approach the *Placuncæ*" falls to ground. Its single obtuse tooth in *one valve only* separates it from *Corbula*, as its internal ligament does from the Linnean *Tellina*.



## CORBIS.

—◆◆—  
Cuvier.—Regne anim. p. 481.  
—◆◆—

**TESTA** transversa, æquivalvis, libera; *umbonibus* oppositè incurvis; *Cardo* dentibus duobus; *dentes laterales* duo, *posticus* ad cardinem propius admotus, *anticus* remotus; *Impressiones musculares* simplices.

ALL the species of this Genus that have hitherto come under observation are *transverse* shells (that is, they are longer in a direction tranverse to the position of their hinge-teeth): in common with many other bivalves, the *umbones* are curved inwards, in opposite directions in the two valves. There are *two cardinal* and *two lateral teeth* in each valve; the posterior, or that which is on the opposite side of the hinge to the ligament, is much nearer to the cardinal teeth than the other, which is rather remote, but placed near the termination of the *ligament*. This is external, but the parts to which it is attached form a deep groove when the two valves are closed; when also, a rather oblong cordiform impression immediately behind the umbones may be observed.

This Genus was established by Cuvier, and is adopted by Lamarck, it is related to *Lucina*, but may be distinguished from that Genus by its muscular impressions, which are simple and rather oblong, but neither of them produced into an elongated tongue shape; it approaches also to *Tellina*, but, wanting the fold of the anterior margin of that Genus, it will not be confounded with it. Not many species of this Genus are yet known, the only recent one with which we are acquainted is a very beautiful transversely oval, rather gibbous shell, with longitudinal striæ and undulated transverse furrows, and its interior margin is crenulated; it is the *Venus fimbriata* of Linné, the *Cor-*

## CORBIS.

*bis fimbriata* of Cuvier, and according to Lamarck, an inhabitant of the Indian ocean. Two fossil species are described by *Lamarck*, both of which are found in the more recent formation above the chalk, one at Grignon, and the other at Granville. Neither of them are so gibbous as the recent one.

Whether the shells of this Genus be covered with an epidermis in their natural state or not, we have no means of ascertaining; there is, however, some reason for believing this to be the case.

## PEDUM.

—◆◆—  
*Brug.*—Encycl. Method. t. 178. f. 1—4.  
 —◆◆—

**TESTA** elongato-securiformis, compressa, inæquivalvis, subauriculata, adhærens; *umbonibus* paulùm distantibus. *Valva inferior* propè cardinem profundè sinuata, lateribus reflexis; *discus deltoideus cardinis* fossulâ obliquâ elongatâ ligamentum inserviente. *Valva superior* lateribus incrassatis, *discus deltoideus cardinis* minùs expansus, cicatriculâ elongatâ obliquâ *ligamentum* gerente. *Impressio muscularis* unica, suborbicularis.

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VERY properly separated from *Ostrea* by *Bruguière*, and adopted by succeeding writers; it differs from the true *Ostrea* in the mode of attachment, adhering by a (probably fibrous and horny) substance which passes through the sinus in the lower valve, whereas *Ostrea* is attached by the outside of the shell itself. The shell of *Pedum* is compressed, inequivalve, subauriculate, rather longer than it is wide, and wider at the base than at the hinge; the *umbones* are somewhat distant. The sides of the lower valve are turned upward in all the specimens we have had the opportunity of examining, and there is a deep sinus, for the passage of the substance by which the animal attaches itself, near the hinge on the left hand side; a triangular disk with an oblique elongated central furrow bears the hinge ligament in this valve. The sides of the upper valve are thickened, the triangular disk in the hinge of this valve is smaller than that in the lower valve, and it has an elongated oblique *cicatrice* opposite to the furrow of the other valve to which the *hinge ligament* is attached. The principal portion of the ligament is attached to the central furrow in the tri-

## PEDUM.

angular disk of the hinge of the lower valve, and to the opposite cicatrice in the upper valve, but the ligament is expanded on both sides, so as nearly to cover the triangular disk in both valves. There is a single, large, suborbicular muscular impression in each valve.

The only species of this Genus at present known is the *Pedum spondyloideum* of Lam. *Ostrea spondyloidea* of Gmel. probably so named on account of the near resemblance of its hinge to that of *Spondylus*, from which however it is sufficiently distinct. It approaches nearer to Lamarck's *Malleus*, particularly in its manner of attachment, but the shell is destitute of the foliated substance consisting of fine perpendicular fibres so characteristic of that Genus as well as of *Ostrea*. It cannot be confounded with any other Genus.

From the Indian Ocean. No fossil species has yet been discovered.

## ANCILLA.



*Lam.*—Syst. des Anim. sans Vert. p. 75.



**TESTA** oblonga, subcylindrica, *spirá* brevi, non canaliculatâ. *Apertura* elongata, basi emarginata, effusa. *Appendix* tumida et obliqua ad basim columellæ.



WE have no hesitation in retaining Lamarck's original name for this Genus; partly because we wish to avoid unnecessary innovation, and further, because we think it is sufficiently different to be easily distinguished from Müller's *Ancylus*.

In general form the shells of this Genus are oblong and subcylindrical, they have a short *spire*, seldom exceeding a third of the whole length of the shell, and the *volutions* are not separated from each other by a canal, as they are in *Oliva*, but the line of separation is generally hidden by an enamel-like shelly deposition which extends far beyond it, and sometimes covers the whole upper part of the shell. The *aperture* is elongated, wider at its lower than at its upper part, and notched at its base. The *Columella* is smooth, with an oblique, tumid, generally striated appendage, or varix at its base. The whole shell is very smooth and shining, and, as we believe, destitute both of epidermis and operculum.

The only Genera with which this can be confounded, are *Terebellum* and *Oliva*; the striated, tumid varix distinguishes it from *Terebellum*; and it wants, as before observed, the canal which separates the volutions in *Oliva*. Only a few recent species are known, they are placed among the Linnean *Voluta*; but though the animal is not known, there is reason to believe, that its mantle is extensible over the whole or greater part of the shell, if we may judge from their perfect smoothness. The small num-

## ANCILLA.

ber of fossil species that we are acquainted with, occur in the *Calcaire grossière*, and in the *London Clay*; we have frequently seen one in a sort of *Green sand*, from near Turin.

The *Ancillæ* are marine; it did not at first occur to us that they might be confounded with Lamarck's *Melanopsis*, a fresh water Genus, as we know they have been, particularly some of the fossil species; this latter is, however, sufficiently distinct, and may be known by the tumid upper part of its inner lip, and by the spiral line being distinct, and not covered over with a shining enamel-like coat; when recent, moreover, the *Melanopsis* has a strong blackish epidermis, and an horny operculum.

Our Fig. 1. most nearly resembles Lamarck's *Ancilla marginata*, but it has not the "*spira carinulata*" mentioned by him in the character of that species. We believe Fig. 2. is *A. subulata*, which differs from *A. buccinoides*, in being less gibbous. Fig. 3. is probably *A. glandiformis* of Lam.

## PLICATULA.



*Lam.*—Syst. des anim. sans vert. p. 132.



TESTA *irregularis* inæquivalvis, inauriculata, basi attenuata; *marginè* supero rotundato, subplicato; *umbonibus* inæqualibus; *areis* externis nullis.—*Cardo* dentibus duobus validis in utrâque valvâ. *Fovea* intermedia *ligamentum omnino* internum recipiens.



THE above Generic character appears evidently to have been intended by Lamarck, to distinguish this Genus from *Pecten* and *Spondylus*, to both of which it has some affinity, but particularly to the latter, in which the species of it have been placed by *Linné*, *Gmelin*, and others, whose *Spondylus plicatus* may be considered as the type of the Genus.

The two valves in *Plicatula* are not alike, one being rather convex and attached by its outside, generally near the umbo, to submarine bodies; the other being flatter in most of the species, and somewhat so in all. The general form of the shell is like an oyster, without the auricles, which distinguish *Pecten* and some of the other Genera included in the Linnean *Ostrea*; the base or umbo is attenuated, and the opposite margin rounded, and generally more or less plaited; the *umbones* are unequal, that is, the umbo of the attached valve is more produced than the other; their points are not separated by any external area or disk, as in *Spondylus*. Two distinct, generally perpendicularly grooved teeth are seen in each valve, these have their points turned backwards, and they are so locked into each other that the two valves cannot be separated without breaking them, nor can they be opened wide without using extraordinary violence; in the center of the hinge between



## PLICATULA.

the teeth is a small hollow space in each valve, to which is attached the entirely internal ligament. A single, strongly marked, orbicular, *muscular impression* is observable near the center of each valve.

Not many species are known; the recent one of which we have given a representation, is the *P. ramosa* of Lamarck, in his *Histoire Naturelle des Anim. sans vert*; why he should have altered its name from *gibbosa*, formerly established by himself in his *Système*, we know not; we should rather have retained the former name, for if we do not misunderstand the term, *ramosa*, as a specific name, conveys the idea of a branched shell, whereas he means it to describe the branched plaits of the outside of the shell. A few fossil species are described, they are characteristic of the Lias. One found near Metz, is engraved in the *Encycl. Methodique*, and quoted by Lamarck as a *Placuna*. All those we have seen are more or less closely covered with small spines.

Fig. 1 *Plicatula gibbosa*.

2 ————— a younger specimen of the same, attached to an Arca.

3 ————— *spinosa*.

## POTAMOPHILA.



Galathea.—*Brug.* Encycl. method. pl. 250. f. 1. a. b. c.



TESTA crassa, transversa, æquivalvis, subtrigona, epiderme virente induta. Dentes cardinales crassi; duo in valvâ dextrâ, basi conniventes; tres in alterâ, in triangulum dispositis, intermedio minore, distincto. Dentes laterales indistinctissimi, remotiusculi. *Ligamentum* externum, breve, prominens, turgidum. *Nymphæ* prominulæ. *Impressiones musculares* in utrâque valvâ duæ, versûs basis testæ excavati.



WE regret that we are obliged to change the name of this Genus; this necessity arises from the circumstance of Lamarck's having employed the name of Galathea twice, in one instance to denote a Genus of Crustacea, and in the other for the shell in question; and we find Galathea, already adopted by others, as the Generic name of the Crustaceous animal, for which it claims also the right of prior application, having been adopted by *Lamarck* from *Fabricius*. We have, therefore, applied the term *Potamophila* to the shell, which will designate the predilection of its animal inhabitant for River water in preference to that of the Sea.

In comparing our specimens with the Generic Character and description given by Lamarck, we find we cannot comprehend several expressions which he has made use of; the first, when speaking of the three teeth in the left valve, he says, "*L'intermediaire avancée, grosse et calleuse*," whereas, we find the intermediate of the three to be the smallest, and the least prominent; the second, "*Dents cardinales sillonnées*," whereas, we find no grooves on the cardinal

## POTAMOPHILA.

teeth; the third, "*Dents laterales écartées*," whereas, in one valve we cannot find any lateral teeth, and in the other they are very obscure, and placed near the cardinal teeth; the fourth, "*Les impressions musculaires paraissent double de chaque côté*," whereas, upon careful examination, we find no double appearance of the muscular impressions.

An equivalve, transverse, subtriangular shell, of a very thick substance, and covered on the outside with a thickish olive green epidermis, which is generally worn off at the *umbones*, and the shell eroded, as in most other fresh water bivalves. The *cardinal teeth* are thick and large: there are two in the right-hand valve, which are united towards the umbo; three are observable in the other valve, placed in the form of a triangle, the anterior of these is obliquely elongated; the intermediate one is thick at the base, and pointed at the apex, it is the smallest, and is quite separated from the other two, it fits into the cavity formed between the two united teeth in the right-hand valve; the posterior tooth in the left-hand valve is the largest, it is oblong, its apex is prominent, and there is a small cavity near its base. There are very indistinct *lateral teeth* in the right-hand valve, which are placed not far from the cardinal teeth; we cannot find any lateral teeth in the other valve. The *Cardinal ligament* is external, short, prominent, swollen, and the parts to which it is attached are also prominent. There are two *muscular impressions* in each valve, which are very deep towards the base of the shell.

Only one species of this Genus is known; it is the *Venus subviridis* of Gmel. but is very distinct from *Venus*; beneath the epidermis the shell is very white, *sometimes* violet coloured near the base, and marked with several violet rays. Our engraving is taken from a specimen in which the shell is colourless; the epidermis alone having some rays of a darker colour than the rest. It is a scarce shell, and highly valued by Collectors. Lamarck says, it is an inhabitant of rivers in the island of Ceylon, and the East Indies: our specimen is from the river Congo; several were brought from thence, by the survivors of the late unfortunate expedition.

## CRASSATELLA.



TESTA æquivalvis, transversa, inæquilatera. *Cardo* valvæ alterius dentibus duobus; alterius dente unico: *dentes* plerumque crassi, sulcato-rugosi. *Ligamentum* internum, foveolæ cardinali in utrâque valvâ insertum. *Impressiones musculares* duæ, distantes, laterales. *Dentes laterales* nulli, aut obsoleti.



THE *Crassatellæ*, probably on account of their extreme rarity, and also of the general resemblance to *Maclæ*, seem scarcely to have attracted the attention of English Conchologists; it is true they have not much gay colouring to recommend them to Collectors, but to such as admire Nature with a scientific eye, and in her more homely attire, they are not totally uninteresting; for to the internal ligament of the *Maclæ* they join a general resemblance in form to some of the *Donacidea* and *Veneridea*, and, therefore, seem to form a link of union between those families. However, we do not presume to say, that their resemblance to either is very strong.

Shell equivalve, transverse, inequilateral, not attached nor gaping. In one valve there are two, strong, cuneiform, rugose, sometimes perpendicularly grooved, cardinal teeth; and in the other only one. We understand Lamarck to say, there are two in each valve; but in five or six species which we have examined, we find scarcely any traces of more than one in the right-hand valve. Ligament internal, attached to a concave space placed on the anterior side of the hinge; this pit, to which the ligament is attached, is divided by a carina into two portions, and that part of the ligament which is attached to the outer portion is visible externally when the valves are closed: two strong oblong depressions may then be observed, one on the anterior

## CRASSATELLA.

side of the umbo, rather elongated and not so distinct as the other on the posterior side. There are two, distant, lateral, rather oblong, muscular impressions. Lateral teeth none, or nearly obsolete. The shells of this Genus are generally very thick, particularly the more aged specimens; the recent ones have a brownish, somewhat horny epidermis; all are, more or less, transversely grooved, particularly near the umbo.

The few recent species of this Genus at present known, are marine; several of them are brought from the coasts of New Holland; we have represented two, the *C. Kingicola* and *C. rostrata*. The *C. tumida* and *C. compressa* are fossil species from the Calcaire grossière of the environs of Paris; we have another fossil species, the *C. sulcata*, very common at Hordwell; it appears to be characteristic of the London Clay.

Fig. 1 Insides of *Crassatella tumida*.

2 *Crassatella compressa*.

3 *Crassatella rostrata*

In a second plate are three views of *Crassatella Kingicola*.

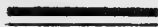
## HARPA.



*Lam.*—Syst. des anim. sans vertebr. p. 79.



**TESTA** ovalis, ventricosa, *spirâ* brevi, *anfractibus* longitudinaliter costatis : *apertura* oblonga, ampla, basi emarginata, vix in canalem producta : *Labium externum* incrassatum revolutum ; *internum* expansum, columellam tegens, basi acuminatum.



AMONG the varied and numerous testaceous inhabitants of the ocean, the Harps claim a decided superiority in elegance of form and beauty of colouring ; the rarer sorts are accordingly much esteemed by Collectors, particularly the *many ridged Harp* (*Buccinum costatum*, Linn.) which we have chosen to represent as the type of the Genus : the principal difference between it and the other Harps consists in the greater number of longitudinal ridges which are formed on its outer part.

In their general form, the *Harpæ* are oval and ventricose ; their *spire* is short, and the *volutions* are rounded, so that the *spire* has the appearance of several domes gradually diminishing in size, surmounting each other. The *aperture* is oblong, large, its base is notched, but scarcely produced into the form of a canal, the outer lip is thickened and turned outwards ; it is remarkable that the animal inhabitant produces this thickened revolute lip at frequent periods in its growth, forming a number of elevated ridges on the outside : this character is not peculiar to the Harp ; we find it more or less in many marine shells, and in a few land species, but in none does the period at which it completes its mouth recur so frequently as in *Harpa* and *Scalaria*. The inner, or columellar lip, is spread over a portion of the last volution, and over the columella ; at the

## HARPA.

upper part it is united to the outer lip, and at the base it terminates in a point. The ridges, or costæ, on the outside of the shell are generally pointed at their superior extremity, and then turn to the left to join themselves to the upper part of the inner lip.

The *recent* species of this Genus, which are not numerous, are all inhabitants of the Indian ocean, and their animal is unknown. A single fossil species occurs rarely at Grignon, near Paris; at Bordeaux, and near Valognes; we have represented it; its spire is more distinct, and the interstices of the ridges are prettily reticulated.

Fig. 1 *Harpa multicostata*.

2 —-- *mutica*.

## OLIVA.



*Brug.—Encycl. method.*



**TESTA** oblonga, subcylindrica, lævigata *spirâ* brevi, *anfractibus* canaliculo separatis: *Apertura* elongata, basi emarginata: *Columella* obliquè striata; appendice ad basim sub-tumidâ et obliquâ.



LAMARCK informs us, that only two species belonging to this Genus have been described by *Linné*, they are his *Volutæ Porphyria* and *Oliva*. They are evidently placed by him among the *Volutæ*, on account of the striæ on the *Columella*, without reference to the great peculiarity of the canal which separates the volutions from each other, and by which the Olives are so easily distinguished from all other shells.

Shell oblong, subcylindrical, with a short spire, whose volutions are separated from each other by a narrow canal. Aperture elongated; rather narrow, notched at its base. The *Columellar* or *internal lip*, is obliquely striated, and it has at its base an oblique, rather tumid, striated *appendage* or *varix*, like that of *Ancilla*, but not so distinct. Smooth all over, and the volutions above the canal coated with a shelly enamel-like substance. Distinguishable from *Ancilla* by the striated columella, and the canal which separates the volutions.

There are many, undoubtedly, very distinct *recent* species, and many more varieties of *Oliva*, some of which are naturally very beautifully coloured; others, which are not so prettily coloured by nature, are, nevertheless, rendered very handsome, by artificially taking off their outer coat. They are common, and on that account not highly valued. The *fossil* species are few and scarce, they occur



## OLIVA.

in the *London Clay*, in the *Calcaire grossière*, and in a kind of green sand, probably the debris of Volcanic rocks, near Turin.

The Olives are marine; their animal is unknown; we think with Lamarck, that its mantle is extensible over the whole shell; he is of opinion that it is carnivorous.

Fig. 1 *Oliva Porphyria*, commonly called the Camp Olive.

2 — *Maura*.

3 — *subulata*.

4 — *Clavula*, a fossil species, from Bordeaux.

## PLANORBIS.



TESTA discoidea, *spirâ* depressâ, apice semper distincto, anfractibus rotundatis, plerumque carinulatis, *aperturâ* integrâ, altitudine latitudinem adæquante: *labio* nonnunquam incrassato, expanso, inferiori parte prorsum extenso: *umbilico* expansissimo.

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THE principal peculiarity in this Genus, appears to us to consist in the fact, that all the species, as far as we have had the opportunity of examining them, prove to be what are commonly called *reverse* shells, that is, having their volution turning exactly in the opposite direction to that of ordinary shells; this fact has been doubted by some, while others have either not observed or have denied it, and consequently have described the principal species as being *supra umbilicata*. Fortunately for those who wish to be correct, it is a point very easy to ascertain, as several of the species are among the commonest in stagnant waters and ditches, almost every where; so that whoever will take the pains to observe, will find that the animals carry their shells in an opposite direction to that of other testaceous mollusca, and that the heart is placed in this on the right side, and the respiratory orifice on the left, exactly the reverse of their position in most others, but the knowledge of the animal is not indispensably necessary in proof of this; the shell possesses in itself all that is requisite for the demonstration of this peculiarity. It is only needful to observe, on which side of the shell the very *apex* of the spire is actually to be seen, and taking that side for the upper, in conformity to the strict rules of analogy, it will immediately be evident, that the aperture is on the left-hand side: we are happy that an attentive examination, not only of the animal inhabitants of several species, but of the shells of several others, has enabled us to decide this point to our own satisfaction; because we are free to confess, that for a long time we had entertained great doubt about the identity of some of the fossil species, which we are now satisfied are reverse shells, in the same manner as

## PLANORBIS.

the other *Planorbes*, although the *lower* part of the disk is almost flat and carinated at its edge; and therefore bears a considerable resemblance to the flattened *spire* of some Land shells, particularly the *Helix albella*.

The Genus *Planorbis*, may be defined as a discoid shell, with a depressed spire, whose apex is always distinct; its whorls turn from right to left, so that when the spire is held upwards and the aperture seen, it is on the left-hand side; they are ventricose, frequently carinated, either above or below: the aperture is entire, its breadth equal to its length, sometimes greater, but, we believe, never less; sometimes the *peritreme*, or lip, is thickened and expanded, and its lower part is always extended forwards: the umbilicus is very much expanded, it has no operculum.

The *recent* species are the *Helix cornea*, *complanata*, *carinata*, *Spirorbis*, *Vortex* of Linn., and such other fresh water shells as agree with them in general form, and being destitute of an operculum; these are common European shells: one or two species are found in America, with thickened and expanded lips.

Several *fossil* species abound in the distinctly fresh water strata of the Isle of Wight and the neighbourhood of Paris, where they are very abundant, and accompanied by as great a profusion of *Limnei* and some other decidedly fresh water shells; it is worthy of remark, that one of the commonest at the Isle of Wight, has a blunt carina at its lower edge, and its umbilicus so flat and extended, as to cause the lower part to be easily mistaken for the spire, but it may be distinguished by the center on the flat side being umbilicate, and the apex being seen on the other side.

- Fig. 1. *Planorbis corneus*.—Lam.  
2. ——— *Guadaloupensis* n.  
3. ——— *carinatus*.—Drap.  
4. ——— *bicarinatus* n.  
5. ——— *Euomphalus*.—Sowerby.

Of these, the first four are recent species; *P. corneus* and *P. carinatus*, being common English species; *P. bicarinatus* is an American species, with an expanded and thickened lip; we have named it from its being carinated both on the side of the spire and on that of the umbilicus. The *Planorbis Euomphalus* is the fossil species, of which we have spoken more particularly above.

Some species, particularly when young, are covered with an hairy epidermis.

## AMPULLARIA.

Lam.—Syst. des Anim. sans vert. p. 93.

TESTA globosa, aut globoso-discoidea aut discoidea umbilicata; *spirâ* brevi; *anfractibus* ventricosis: *aperturâ* oblongâ, integrâ altitudine latitudinem superante; *Operculo* testaceo, annulari, *nucleo* subcentrali, laterali.

IN introducing the Genus *Ampullaria* to the notice of our readers, we feel ourselves called upon to *explain* the character which Lamarck gives to its animal inhabitant, of being furnished with an *horny* operculum, for we believe that all the *Ampullariæ* possess an operculum as completely shelly as the shell itself, and covered with precisely the same kind of epidermis. We do this with regret, because we never intended to arrogate to ourselves the character of conchological censors, and because in the prosecution of our work we find so many errors, and so general a carelessness in description as well as nomenclature; but we hope to do it with tenderness, feeling our own liability to error, and not doubting that in many instances we shall be obliged to claim the same degree of indulgence we would extend to others. We suppose then, that Lamarck, when he first established the Genus, meant to include in it not only the nearly globose, umbilicated shells, now distinguished by the name of *Ampullaria*, but also some others which he has since called *Paludinæ*, and which have truly an *horny* operculum and are more turrit shells. We are convinced also, that there exists a much more considerable difference between the true *Ampullariæ* and the Planorbis, than appears from the consideration of the characters Lamarck has assigned to them in his *Système*, which he there makes to consist almost entirely in the discoid form

## AMPULLARIA.

of *Planorbis*: however, we are certain that the principal differences between the shells of these two Genera are to be found in the form of the aperture, and in the presence or absence of an operculum; for which reason we are obliged to take the shell he has given as the type of *Planorbis*, and add it to the genuine *Ampullariæ*; and this we find the less difficulty in doing, as we possess a series of specimens of decided *Ampullariæ*, which pass, by regular gradations, from an extremely ventricose, and nearly globose, to as nearly a discoid form, without any material alteration in the form of the aperture. We do not mean to place any reliance on the fact, that *all* the species of *Planorbis*, of which we have been able to examine the living inhabitant, prove to be constantly reverse shells, because we are aware that some of the *Ampullariæ* are also reverse; but we are disposed to unite with Cuvier in expressing our surprize, that a fact of so great importance should either have been entirely unobserved or remain unmentioned by some, while others (not satisfied with disbelieving the fact) maintain a contrary opinion.

The true *Ampullariæ* may therefore be either nearly globular with a more or less produced spire, or it may be discoid, but still having a more distinctly elevated spire than *Planorbis*: its whorls are ventricose, and it is umbilicated; of course in the more discoid species the umbilicus is larger and more expanded, so that the whorls may be counted on that side as well as on the side of the spire: the aperture is *oblong*, entire and longer or higher than it is wide, whereas in *Planorbis* it is on the contrary rather the reverse; in *Ampullaria* a shelly annular operculum, with a nearly central nucleus, placed towards the inner side, and coated by an olive green horny epidermis, exactly similar to that on the shell, closes the aperture; it is remarkable that this operculum is subject also to the same kind of erosion, commencing near its centre, which is so commonly seen near the apex and on the prominent parts of the shell itself: we think this rather confirmative evidence of an opinion which has been entertained by some, but combated by Lamarck, of the analogy of the operculum in these shells to the second valve of bivalves. Without, however, presuming ourselves to venture an opinion on so difficult a subject, we wish to draw the attention of Conchologists to the nature, use, and peculiarities of structure observable in opercula.

## AMPULLARIA.

We have mentioned above the principal differences between *Ampullaria* and *Planorbis*; there are, however, some other Genera with which it may be confounded, particularly when in a fossil state, or when deprived of its epidermis and operculum, and from which it is essential to distinguish it; these are *Natica* and *Helix*; it differs from the first in wanting the spiral, shelly *callus* which in that genus is seen in the side of umbilicus, and which in some instances entirely fills it up; and from *Helix* in not having its outer lip thickened and revolute.

We are not acquainted with any considerable number of recent species of Ampullariæ, all we have seen are from the Rivers and Lakes of hot climates. Olivier (*Voyage dans L' Empire Othoman, &c.*) mentions one as being found in the Lake Mareotis, in company with marine shells, but all his endeavours to procure the living animal were fruitless: we hesitate to admit into the Genus another reverse species, which he calls *A. carinata*, abundant in a neighbouring river, but which, if we may judge from his representation, has an horny operculum, and should therefore rather be considered as a *Paludina*.

We are not certain that any fossil species of this Genus exists: several are mentioned by Lamarck in the Annales du Museum, among the fossil shells of the environs of Paris; others which are thought to be genuine Ampullariæ are found in the London Clay at Hordwell, and in the mixed stratum between the two fresh water beds at Headen Hill in the Isle of Wight. Those we have represented are all recent species.

Fig. 1 *Ampullaria rugosa*, with its operculum; of this species the aged shells are sometimes much wrinkled.

2 The inside of the operculum of the same.

3 *Ampullaria Cornu-arietis* (*Planorbis Cornu-arietis*.—Lam. in Encycl. meth. pl. 460. f. 3.

4 *Ampullaria subcarinata*: a reverse species from the River Congo: we have named it from the obtuse carina which surrounds the umbilicus.





## PHASIANELLA.



TESTA oblonga, lævis; *spirâ* regulari, elevatâ, acuminatâ; *apertura* oblonga, supra acutangula, basi rotundatâ: *labium internum* parte inferiore incrassatum: *Operculum* testaceum, crassum, spirale, extus convexum; *spira* ad basim internam posita.



SHELL oblong, smooth, with a regular, elevated, rather acuminate spire: whorls somewhat ventricose, but the spiral line not very strongly marked: the aperture is oblong, pointed at its upper part, and rounded at its base: the inner lip is white and thickened, particularly at the base of the Columella: a late Conchological writer prides himself upon having discovered the true character, which, he says, had escaped all authors, that of having a salient, rather internal, but very apparent fold, running along the Columella, which, however, we have searched for very carefully, but in vain. We think it more easily distinguishable from *Bulimus*, by its thick, shelly, spiral, externally convex, operculum, whose spire is placed on the inside, or that side which is attached to the foot of the animal, and near its lower part.

The few recent species of this Genus with which we are hitherto acquainted, are all very elegantly coloured on the outside: the *Phasianella varia* of Lamarck which we have represented, has of late become rather common, though it was formerly very rare, and sold at an enormous price: it is brought from the coast of New Holland, and is very variable in its colours. A small, but most elegant species is found abundantly on some of our coasts, it is the *Turbo Pullus* of authors: we have added a representation of it to our plate.



## PHASIANELLA.

Some fossil species are found in the neighbourhood of Paris, and in the London Clay, they are all small; the principal one, *Ph. Princeps*, is spirally grooved on the outside, and the others have generally some remaining colour in spots as in the recent shells: their fossilized opercula are found with them.

- Fig. 1 *Ph. varia.*—*Lam.*  
2 Operculum of the same.  
3 *Ph. Princeps.*  
4 *Ph. Pullus.*

## MARGINELLA.



**TESTA** ovato-oblonga, lævis; *spirâ* brevi, nonnunquam pænè occultâ: *apertura* elongata, basi emarginulatâ; *labio externo* incrassato, revoluto; *columella* versus basim plicata.



PLACED by Linné among his *Volutæ*, and by Bruguière among his *Mitræ*, but well distinguished by Lamarck from both, the peculiar character from which he has named it, being the thickened and revolute outer lip. The *Marginnellæ* are marine, and though not absolutely internal shells, the mantle of their animal is capable of extension over the whole outer part, where it appears to be constantly depositing shelly matter, so that they are always smooth and shining, and sometimes very thick. They are all very neat small shells, and mostly prettily coloured.

Shell ovato-oblong, smooth, with a short, in some species almost hidden, spire; aperture elongate, narrow, rather wider at the lower than at the upper part, slightly notched at the base; outer lip thickened and turned outwards; this thickened outer lip appears to be formed but once during the life of the animal, of course at the time of arriving at its adult state, after which it only increases the thickness of its shell. Several folds are very distinct at the lower part of the *Columella*; the number and disposition of these, added to the either distinct or almost hidden spire, seem to point out two natural sections in this Genus, which may be characterized in the following manner:

§ 1. *Spirâ* brevi, distinctâ, plicis quatuor ad basim columellæ; to this first section belong the *Volutæ Glabella*, *Dactylus*, *guttata*, *Faba*, *picta*. &c.; and our English species, *Voluta lævis*, Don. or *Cypræa Voluta*, of Mont.: though, in this last, the plaits on the columella are very indistinct.

§ 2. *Spirâ* pœne occultâ, basi columellæ plicatulâ,

## MARGINELLA.

plicis sex, inferioribus majoribus; and to this section belong the *Voluta Persicula*, *V. cingulata*, *V. Porcellana*, &c. and *V. catenata*, Mont.

A few fossil species are found in the Calcaire grossière, near Paris, and in other places; we are not aware that they are found in the London Clay, nor do we know of any in the older formations.

- Fig. 1. *Marginella Glabella* (*Vol. Glabella*, Dillw.)  
2. ——— *cingulata* (*V. cingulata*, Dillw.)  
3. ——— *margiuata*.

## ASTARTE.

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Sowerby—Min. Conch. pl. 137. Aug. 1816.  
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**TESTA** suborbiculata, plerumque transversa, æquivalvis, inæquilatera: *Cardo*, dentibus duobus validis, divaricatis, in valvâ dextrâ; altero dente distincto, altero obsoleto in sinistrâ. Tres impressiones musculares in utrâque valvâ; duæ, laterales, oblongæ, simplices; tertia minutissima, postica. *Ligamentum* externum.

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THOUGH one of the species of this very distinct Genus has already been described by Lamarck, under the Generic name *Crassina*, and although we should, gladly, rather have adopted that name, than the one we have here chosen, as being at least somewhat expressive; yet, in conformity to an established rule, from which it would be improper to depart, we are obliged to use *Astarte*, because it has been applied to several other species of the same Genus, several years before the publication of that volume of Lamarck's *Histoire naturelle des animaux sans vertébrés*, in which he gives his *Crassina*. Still we think that the author of the Genus *Astarte* has extended its application to some species which do not properly belong to it, such as the *Venus Paphia* and *V. fasciata*, both of which have at least three teeth in one valve, and may further be distinguished by having a sinus on the anterior side, close to the anterior muscular impression, in the line to which the mantle of the animal is attached, which sinus is not observable in *A. Danmoniensis*, *Scotica* and other true *Astartæ*: we further presume to think, that by paying a strict attention to the characters we have here given, all misapprehension upon this subject may be avoided. Shell suborbicular, generally transverse, equivalve, inæquilateral; *hinge* with two distinct, divaricated teeth in the right hand valve; in the other, one distinct tooth, and another which is small and very obsolete; in this valve there is also a very indistinct *lateral* tooth. Two ovate or oblong, distant, lateral, simple, muscular impressions are observable in each valve;

## ASTARTE.

a third very minute one is placed just below the indistinct lateral tooth, or at the termination of the posterior external depression: this is not peculiar to this Genus, but may be seen in many others; sometimes, however, it is blended with the lower end of the posterior muscular impression. In all bivalve shells with two muscular impressions, there is a depressed line to which the mantle is attached, and which extends from the *upper* and inner edge of one muscular impression to the other; this line is sometimes deeply sinuated on the posterior side, but in *Astarte* it is essentially simple and not sinuated; we mention this, because we think it an important discriminating character in bivalve shells. The Ligament is external.

The recent species of *Astarte* are the *Venus Danmoniensis* of Montagu (*Crassina Danmoniensis*, Lam.): *V. Scotica*, Mont. (placed also in *Venus*, by Lam.): *V. sulcata*, Mont. and *V. compressa*, Mont.; all these are English shells, and though they undoubtedly occur in other parts of Europe, they do not seem to have been much noticed; they are marine, and all, more or less, externally, transversely grooved, and covered with a strong, horny, generally olive brown epidermis: another has been dredged from the bottom of Lancaster Sound; in this, the umbones are deeply eroded where they have been deprived of their epidermis, but all the specimens we have seen have been long dead and are otherwise much worn, wherefore, we still think the eroded umbones one of the best discriminating characters of fresh water shells. Many fossil species occur in the Crag, in the Green sand, and in the Iron shot or lower Oolite; three species from the last-mentioned stratum are placed by Lamarck in his Genus *Cypricardia*, with the generic character of which, however, they do not agree.

Fig. 1 *Astarte Danmoniensis*.

2 ——— inside of the right-hand valve.

3 ——— inside of the left-hand valve.

4 ——— *modiolaris*,

a fossil species from the inferior Oolite; many other fossil species are represented in Sowerby's Mineral Conchology.

We cannot consider this Genus as related to *Crassatella*, from which its external ligament separates it; it certainly approaches in general appearance, as well as particular characters, much nearer to *Cyprina*, and in Lamarck's arrangement ought to come among his *Conques marines*.

## CUCULLÆA.



*Lam.*—Hist. Nat. des Anim. sans vert. t. 6. p. 33.



**TESTA** subæquivalvis, inæquilatera, trapeziformis, ventricosa; *umbonibus* distantibus, *areâ* ligamenti separatis. *Impressiones musculares* duæ; antica elevata, margine angulato, vel in auriculam producto. *Cardo* linearis, rectus, dentibus minimis subtransversis instructus; utraque extremitate costis duabus ad quinque, subparallelis. *Ligamentum* externum.



THAT the *Cucullææ* resemble the *Arcæ* very nearly in their general external form, in the area which bears the ligament, and in their straight linear hinge, we do not in the least wish to deny; but there are two particularities, besides that of the hinge teeth, by which we think they may be easily distinguished, and which renders it necessary to separate them: the first is, that in *Cucullæa* the two valves are not exactly alike; and the other, that its animal does not appear to attach itself to submarine bodies by a *byssus*, as that of the *Arcæ* does. From this last circumstance in particular, we doubt the propriety of arranging the *Cucullæa* with the *Arcacea*. One observation further seems here necessary; Lamarck says, that the singular ribs (*côtes*) at each extremity of the hinge teeth, ought not to be considered as teeth, but we think that they ought, as they answer the same purpose as the lateral teeth in other bivalves; and, moreover, as they appear to be a continuation of the hinge teeth, only gradually increasing in size and changing their position.

A subequivalve, inequilateral, trapeziform, very ventricose, bivalve; the anterior portion is rendered distinct

## CUCULLÆA.

by an obtuse angle, so that when the two valves are closed, and that side alone is observed, it is cordiform, and longitudinally elevated in the middle: the *umbones* distant, separated by the area to which the external ligament is attached; two muscular impressions in each valve, of which the anterior one is elevated, with a sharp edge, or produced into the shape of a little ear. Hinge linear, straight, furnished with numerous, rather irregular, transverse teeth; and at each extremity, from two to five more elongated teeth, lying in a nearly parallel position with the line of the hinge. The ligament is external; it does not cover the whole area between the two umbones, a small portion of the anterior side remaining uncovered; the area itself increases by age, and becomes transversely grooved.

The dissimilarity between the two valves was not observed by Lamarck, nor is it mentioned, as we believe, by any writer; it is not great, but is observable in several circumstances, the larger valve, into which the other falls, being more deeply coloured, and altogether more strongly marked on the inside, while the smaller one, which is paler in colour, has its longitudinal external striæ more distinct and close set, than those on the other valve. We have reason to believe, that the *Cucullææ* are naturally covered with an epidermis, though this is, for the most part, cleaned off before they are brought into commerce.

We are only acquainted with one *recent* species of *Cucullæa*, nor has Lamarck described more; it is the *Arca Cucullus* of Gmel. *Cucullæa auriculifera*, Lam. in this the teeth are finely, perpendicularly striated. The fossil species are, however, much more numerous; of these, one is described by Lamarck, the *C. crassatina*, it is found in the neighbourhood of Beauvais and at Bordeaux, in beds similar to that of Grignon; but in England several species occur, both in the Green sand and in the inferior Oolite, they are engraved in *Sowerby's Mineral Conchology*: those of the inferior Oolite, are also found at Bayeux, in Normandy.

- Fig. 1 *Cucullæa auriculifera*, Lam.  
 2 ——— inside of one valve of the same,  
 3 ——— front view of the hinge of the same.  
 4 ——— *decussata*, Park.

## IANTHINA.

◆◆◆  
*Lam.*—Syst. des Anim. sans vertebr.  
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**TESTA** subglobosa, tenuis, fragilis. *Apertura* integra, basi angulatâ, parte exteriori rotundato-angulatâ. *Columella* elongata, recta, reflexa. *Labium exterius* in speciem *sinûs* emarginatum vel angulatum.

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A VERY singular animal, which has for a considerable length of time attracted the particular attention of Naturalists; the singularity of its form, the pretty colouring of its shell, the abundant and deeply purple-coloured liquor which it throws out, and the extraordinary vesicular organ by means of which it remains suspended on the surface of the sea, have all contributed to its celebrity. This latter is, however, according to the opinion of the great Cuvier, the only organ peculiar to this animal; it consists in a mass composed of a number of transparent vesicles, attached to the posterior part of the foot, a little below the point to which the operculum is fixed in other genera. Cuvier thinks also that this organ bears some analogy to the opercula of other univalves, and that it may be a vestige of an operculum which has undergone such modifications in its form and structure, as we frequently observe in the productions of nature: in other respects he thinks the animal approaches in its structure to that of the *Buccinum* and *Murex*; having a proboscis or trunk in the same manner as they have, but larger, more elongated and cylindrical. Cuvier says, moreover, that its foot is short and broad; that its structure is the same as that of the other *Gasteropoda*; that it has on each side, a little above its edge, a small longitudinal membrane, which, undoubtedly serves the purposes of a fin. The animal, according to



## IANTHINA.

Lamarck, has four subulate tentacula; but according to Cuvier, only two, which are more deeply forked than those of *Murex*.

Shell subglobose, thin, brittle, and rather diaphanous; its *aperture* angular at its lower part and at its outer side, where however, the angle formed by the union of the upper and lower halves of the outer lip, is much rounded in most of the species, and somewhat so in the common one; *Columnella* straight and elongated, the inner lip turned back over it. The outer lip formed into an angular sinus by the singular projection of its upper half.

Several species of this Genus are known at present; they are all more or less deeply violet-coloured, particularly the lower half of the shell; one species, the *Ianthina fragilis*, (*Helix Ianthina*, Linn.) is very common in several parts of the world; it throws out a deep purple liquor upon being touched; another, the *I. exigua*, is, we believe, peculiar to the Mediterranean; a third, the *I. globosa*, has been brought from Madagascar, and a fourth has been found upon some of our own coasts, but it is very rare: an engraving of it is prepared for Leach's British Shells. Swainson justly observes, that the extreme brittleness of these shells is such, that they are very rarely seen perfect.

We have never seen any fossil species of this Genus, nor are we aware that any exist; a fossil is, however, engraved in pl. 10 of Sowerby's Mineral Conchology, which bears a very near resemblance to it; it is there called *Helix carinata*, and is said to occur in solid grey Limestone, near Settle, in Yorkshire.

Fig. 1 *Ianthina fragilis*, Lam.

2 ——— *exigua*, Lam.

## VOLVARIA.

Lam.—Syst. des Anim. sans vertebr. p. 93.

TESTA cylindrica, convoluta, spirâ pænè occultâ; apertura longitudine testam æquans. angusta, versus basim expansior, basi emarginatâ. Labium externum denticulatum. Columellæ basis plicata.

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NEARLY related to some of the Linnean *Bullæ*, particularly in its general form, and in the circumstance of its being transversely striated on the outside; the plicæ on the base of the Columella at once distinguish it from them: but not from some of the Lamarckian *Marginellæ*, to which also the *Volvaria* is nearly allied in shape; it is not, however, in danger of being confounded with them, for we believe the *Marginellæ* never have less than four plicæ on the Columella, nor are they transversely striated on the outside as the *Volvaria* is, but are polished shells, their outer lip being thickened and reflected, and their animal inhabitant having the power of extending its mantle so as to cover the shell entirely. Of course we cannot say decidedly that the animal of the *Volvaria* has not this power, but if we are permitted in such a case to form our judgment from analogy, we should say it has not, and we should further without hesitation express our opinion that it has a distinct epidermis. We are aware that in all we have said above, we are at issue with the collection at the French Museum; but our opinion is formed upon the comparative view we have taken of the species there arranged under the generic term *Volvaria*, with those of the *Marginella* and *Bulla*, and we find them much more naturally related to *Marginella* than to *Volvaria*. In the *Annales du Museum*, Lamarck mentions his opinion that the *Volvaria* is related

## VOLVARIA.

to *Auricula*, undoubtedly, meaning particularly that kind of *Auricula* which is now called *Tornatella*, for it does not resemble the land *Auricula* in any manner.

Shell cylindrical, convolute, spire almost hidden, being as if pushed into the superior extremity of the shell, where it terminates in a small, blunt, scarcely salient point. Aperture as long as the shell, narrow, rather wider and truncated at the base, outer lip denticulate. Columella with three or four oblique plaits at its base.

Only known in a fossil state: it is found in the Calcaire grossière in the neighbourhood of Paris and Bordeaux, also in the London Clay at Hordwell. Only one species has been hitherto described, the *V. bulloides*, Lam. a second is found near Paris, and that of the London Clay is also distinct; the following characters will serve to distinguish these three species.

Fig. 1. *V. bulloides*; testa apice basique truncatis; striis transversis punctatis obsoletiusculis; columellâ triplicatâ, basi depressâ, tab. nostr. f. 1.

*V. bulloides*, Lam. Ann. du Mus. V. p. 29.

Found at Grignon, near Versailles, and in other places in the environs of Paris.

2. *V. concinna*, testa apice basique truncatis; striis transversis punctatis confertis; columellâ biplicatâ, basi elevatiusculâ. Tab. nostr. f. 2.

This is an hitherto undescribed species, found also in the neighbourhood of Paris; we are not acquainted with its precise locality.

3. *V. acutiuscula*, testa apice acutiusculo; spirâ occultâ; striis transversis, punctatis, numerosis, punctis quadratis; Columella, 4 plicata, plicis irregularibus. Tab. nostr. f. 3.

Found in the London Clay at Hordwell; this is a variable species, indeed out of five or six specimens communicated by Miss Beminster and Miss Salisbury, there are not two precisely alike. Some specimens have also been communicated to my Father, from the fine collection of the Viscount Fitzharris, which are also equally variable.

## CANCELLARIA.



**TESTA** ovalis, subturrita, anfractû ultimo plerumque ventricosus. *Apertura* modò non integra, basi levitèr canaliculata, nonnunquam in *canalem* brevem, recurvam, producta; *labium externum* transversè sulcatum; *internum* expansum; *columella* plicata, *plcis* plerumque magnis, compressis.

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THOUGH placed by Linné among the *Volutæ* and by Bruguière among the *Mitræ*, we do not think we are interfering with the labours of the Gentleman who is at present engaged in developing the beauties and distinctions of those two Genera, in so elegant and comprehensive a manner and so much to the advancement of our favourite science; by endeavouring to trace the characters peculiar to the present Genus, *Cancellaria*, of Lamarck! That Bruguière should have placed the shells belonging to this Genus among his *Mitræ* would have appeared rather extraordinary to us, did we not see also among the same Genus several others, such as *Marginella*, *Columbella* and *Ancilla*; for we think (with Montfort) that the *Cancellaria* approaches much nearer in natural affinity to *Purpura*, though it is well distinguished from that by the folds upon the Columella. To some of the Turbinelli it approaches very nearly in general appearance, and in the folds of the Columella, but is distinguished from them by the transverse grooves in the outer lip.

The general form of the shells of this Genus is oval: in most of them the spire is short, but a few species have a lengthened spire: the last whorl being generally much larger than the others and ventricose. Aperture not quite entire, the lower part being always somewhat produced into a canal, and that sometimes distinct but short and recurved: the outer lip is transversely grooved within and the inner lip is spread over the Columella and a portion of the lower part of the last whorl: the Columella is plaited, its folds are generally large, distinct and compressed, sometimes small and few, placed far within, so as to be scarcely seen without breaking the shell; or very low upon the Columella. Some of the species have distinctly varicose

## CANCELLARIA.

sutures, having completed a reflected outer lip at various periods of their growth; in a very few species these *varices* are regularly placed in two equi-distant rows passing from the apex to the base of the shell: from these and other characters we think it will be convenient to divide the species of this Genus into four sections, as follows:

§ 1. Testæ apertura in canalem brevem, recurvam, producta; plicis columellæ superioribus compressis.

To this section belongs the *Cancellaria reticulata*, Lam.

§ 2. Apertura in canalem brevem, recurvam, producta; columella biplicata, plica inferiore majore; varicibus paucis, irregularibus.

To this section belongs the *Murex senticosus*, Linn. (*Phos senticosus*, Montf.)

§ 3. Apertura pænè in canalem producta; columella triplicata; varicibus distinctis, bifariis.

The only species we know belonging to this section is a very elegant small shell, which we believe is not described; we have therefore named it and engraved it in our plate: it is a fossil, found near Paris.

§ 4. Apertura pænè in canalem producta; columella biplicata, versus labium externum inflexa.

Several fossil species represented in Brocchi's *Conchiologia fossile subappennina* and some others found at Bordeaux, belong to this section.

A very elegant and well characterized Genus, of which several recent species have been long known; they are inhabitants of the Indian ocean and of the coasts of Africa and America; they are rare, but not very remarkable, and have therefore never risen to great fame among collectors; nothing, however, can be more elegant than the cancellated or reticulated, sometimes strongly varicose outside, decussated by almost as strong transverse lines. The fossil species are many of them extremely beautiful: they are found in the London Clay at Hordwell; in a similar formation at Piacenza; and in the Calcaire Grossière about Paris; at Bordeaux and in the Cotentin.

Fig. 1. *Cancellaria reticulata*, which is, perhaps, the commonest of the Genus and may be considered as the Generic type; it is the *Voluta reticulata* of Dillw.

2. *Cancellaria costata*, which we have thus named on account of its strongly marked ribs on the outside; it is figured in the *Encycl. Methodique*, tab. 374, f. 5. and is the *Voluta Cancellata* of Dillwyn.

3. *Cancellaria elegans*: a shell which we do not find described anywhere; it is from a specimen in Mrs. Mawe's collection.

4. *Cancellaria suturalis*, a fossil species from the neighbourhood of Paris, we have named it from its double row of varicose sutures.

5. *Cancellaria lyrata*, *Voluta lyrata*, Brocchi, *Conch. fossil. subapp.* t. 3. f. 6.

In the above figures, we have taken care to give an example of each of the sections, into which we have divided the genus.

## MONOCEROS.

—◆◆—  
*Lam.*—*Encycl. Methodique*, tab. 396.  
—◆◆—

**TESTA** ovata, spirâ brevi, anfractu ultimo majore; aperturâ expansâ, in canalem brevem productâ; labio externo, ad inferiorem partem, processu elongato, acuto armato. Columella planulata, lævis.

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ARRANGED by Bruguière among the *Buccina*, but separated from them by Lamarck, who at first included the shells of the present Genus with the *Purpuræ* (in his *Système des Anim: sans vert.*) to which they are certainly very nearly related; but who has since instituted the Genus *Monoceros*, to include the shells commonly called “Unicorn Scoops” in English, and “*Licornes*” by the French.

The shells, which Lamarck has thus united together under the Generic name *Monoceros*, are of an ovate general form: the spire is short, sometimes very short, so as not to be produced beyond the upper part of the last whorl, which is much larger than the preceding whorls: the aperture is consequently expanded, and at its base there is a short canal. Just within the outer lip in some species, there is a row of small teeth; but the principal peculiarity, and the character which distinguishes this Genus from *Purpura*, is an elongated acute process, or tooth near the lower part of the outer lip and close to the canal; from which it obtains its name. As in many of the *Purpuræ* and as in some of the shells, placed in *Turbinellus* by Lamarck, the lower part of the last whorl on the side of the aperture is, in most of the species, abraded or worn away to make a smooth place upon which the inner or Columellar lip spreads itself. The Columella is smooth and flattened.

In its general characters, as well as in the asperities on the outer surface, the shells of this Genus are very

## MONOCEROS.

nearly related to many *Purpuræ*; there cannot exist a doubt, that like them they have an operculum: above we have shown the principal distinguishing character: but *Monoceros* also very nearly resembles the *Concholepas*, a shell included by Bruguière in *Buccinum*, but placed by Lamarck among the *Patellæ*; the testimony which is borne by several, to the fact of this last-mentioned shell possessing an operculum, compels us to believe, that it is much more nearly related to *Purpura* and *Monoceros*, and that it should therefore be placed in the same family with them.

The recent species of this Genus of marine shells, are not numerous; it is with difficulty that some of them are distinguished, because, like the *Purpuræ*, they are subject to so much variation. A single fossil species is figured by Bruguière under the name of *Buccinum monacanthos*: it is the only one we know of.

- Fig. 1. Represents *Monoceros imbricatum*, a shell which is far from being common, though perhaps the most frequent of the Genus.
2. Represents a shell, which differs from *M. imbricatum* in having a short spire, scarcely produced beyond the upper part of the last whorl: we consider it as only a variety: it is not essential to the nature of this work, that we should decide this point; if it be a distinct species; *breve* would be a suitable name.
  3. Nearly resembles the figure given in the Encycl. Method. of *M. crassilabrum*, Lam. We avoid speaking with certainty to this point, because we have no description to refer to: we think it distinct, and if it prove so, we should suggest the specific name of *lugubre*.
  4. *Monoceros cingulatum*, Lam. a very curious and uncommon species in which the inner part of the lower volution is not abraded, as it is in the others.

Besides these, the three last of which are in Mr. Du-bois's collection, we have seen several other very distinct species in the same collection, and some in Mrs. Mawe's.



## CYRENA.

Lam.—*Hist. Nat. des Anim. sans vert.* t. 5. p. 551.

**TESTA** rotundato-subtrigona, ventricosa; æquivalvis, inæquilatera, *dentibus* utriusque valvæ *cardinalibus* tribus, *lateralibus* duobus, *postico* ad cardinem propiùs admoto, *antico* remoto. *Impressiones musculares* duæ, laterales, distantes. *Ligamentum* externum, lateri majori insertum.

IN forming his Genus Cyrena, Lamarck seems to have depended for his distinguishing characters, principally upon the shells which constitute it being possessed of three hinge teeth; upon their umbones being much eroded, and upon their being in general thick and large shells: much experience is not, however, necessary, to prove how little dependance must be placed upon such characters as those of size and erosion of the umbones. As distinctive characters between one Genus and another, or one species and another, these can be of very little importance, particularly with respect to fluviatile shells, because we see that all such shells are commonly eroded, many of them are very large, and the thinner are constantly less eroded than the thicker. The situation, number and peculiarities of the teeth and hinge must, therefore, still be recurred to as the best generic distinctions in several families of bivalve shells. It appears to us convenient to follow Lamarck in separating the Genus Cyrena, though it is not distinguished by Bruguière from Cyclas; its species are placed by Gmelin among the Veneres and Tellinæ; they are all fluviatile shells, and covered with a strong epidermis; we believe none of them are found in Europe, but that they are all inhabitants of warm climates. Of recent species there are not very many: Lamarck mentions eleven; two or three that are not described by him are known to us, one of which we have represented. Lamarck's two divisions of the Genus are founded upon the presence or absence of striæ upon the lateral teeth; ours belongs to the second division, which is destitute of these striæ.



## CYRENA.

Shell subtriangular, with much rounded angles, ventricose, equivalve, inequilateral. Cardinal teeth in each valve, three; lateral teeth, two; in one valve the posterior one is placed near the hinge teeth, the anterior one being farther off and before the ligament; in the other valve there is a deep groove placed between two teeth, one of which is large, and the other nearly obsolete. Ligament external, on the larger side. Muscular impressions two, lateral, distant.

In the species which we have represented a circumstance of rather singular nature is observable; (also to be seen in many specimens of the fossil species of the Isle of Wight,) if the outside of the shell between the umbones where it is much eroded be examined, the remains of the older portions of the hinge teeth will be seen standing out in relief, showing that they have resisted the action of the eroding matter better than the shell itself; which we believe to have arisen merely from the different position of the molecules of which they are formed.

Several fossil species of *Cyrenæ* are found in great abundance in the stratum, commonly called "the upper marine formation" in the Isle of Wight, but which we have elsewhere shown\* to consist of a mixture of marine and fresh water shells, in which the latter predominate. They occur also in a somewhat similar stratum at Woolwich and in some other places in the vicinity of London, as well as at Hordwell; and near Paris where this kind of mixed stratum has been long recognized.

Having thus published a species which we believe to be hitherto undescribed, we are compelled to name and define it, though this is a task we did not intend to undertake when we commenced this work.

*Cyrena Sumatrensis*. Testa ovalis, gibbosa, crassa: dentibus duobus cardinalibus majoribus angulatis, subbifidis.

Brought from Sumatra by Mr. Griffiths: the specimens we have seen are white within, but we are informed that the inside is sometimes of a beautiful purple colour: the angular, nearly bifid, two larger cardinal teeth distinguish it from all the other species we have seen as well as from those described by Lamarck.

Several of the fossil species will be found represented in Sowerby's Mineral Conchology, under the Generic name *Cyclas*.

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\* See Annals of Philosophy, Aug. 1821.

## PECTUNCULUS.

—◆◆—  
*Lam.—Hist. Nat. des Anim. sans vert. t. 6. p. 47.*  
 —◆◆—

**TESTA** orbicularis, sublenticularis, æquivalvis, subæquilatera, clausa. *Cardo* arcuatus, *dentibus* numerosis, obliquis, serialibus, alternatim insertis; medianis obsoletis, subnullis. *Ligamentum* externum.

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PLACED by Linné and later Conchologists among the *Arcae*, to which, indeed, the *Pectunculi* are related in respect of their numerous teeth, arranged in two rows, one on each side of the umbo, as well as in their external ligament; but as these shells have in their general form, and even in their hinge, very sufficient distinguishing characters, it seemed convenient to Lamarck to form them into a particular Genus, which appears very natural, since it detaches a very distinct group, of which there are many species. The *Pectunculi* are easily distinguished from the *Arcae*, not only by the orbicular and lenticular form of their shell, but principally by their hinge, the teeth of which are placed in a curved or arched line, and not straight as in *Arca*; neither are their teeth so numerous or so close set, but larger. The two valves do not gape, and the animal does not attach itself by a byssus, as some of the *Arcae* do; we say as some of the *Arcae* do, for all the shells included by Lamarck in his *Arca* are not gaping shells, nor do they attach themselves by a byssus; and we think with Cuvier, that it would be proper to separate from the Genus *Arca*, those species with distinct ribs, whose crenulated edges shut close and fit into each other, because there is reason to believe their animal is not attached, and rather resembles that of the *Pectunculi*. Although the umbones of the *Pectunculi* are not far distant, they are, nevertheless, always separated by an external facet or area, to which the liga-

## PECTUNCULUS.

ment is attached: this external area, with its angular grooves, distinguishes the Pectunculi, as well as all the other *Arcaceæ* from *Nucula*, which has an internal ligament, and no area between the umbones, consequently should not be arranged with the *Arcaceæ*: to which it bears no resemblance but in the number of its teeth.

Shell orbicular, sublenticular, equivalve, subequilateral, shut close. Hinge teeth numerous, oblique, placed in two rows, one on each side of the umbo, forming a curved or arched line: alternately inserted: those nearest the umbo nearly obsolete. Ligament external, attached to an area on each valve, between the umbones. Muscular impressions two, lateral, distant.

The Pectunculi are marine shells, and have undoubtedly been so named from their resemblance to the *Pectines*, in form, and in their internally crenulated edges, as well as their longitudinal rays. They are covered with a velvety epidermis, except about the umbones, where it is generally worn off. The species are not very numerous, nor are they easily distinguished; the *P. pilosus* (*Arca pilosa*, Linn.) is not unfrequent upon the southern coasts of our Island, it is one of the prettiest species, particularly when young, and belongs to Lamarck's first section, with slight longitudinal grooves: his other section, with strong radiating longitudinal *costæ* or ribs, contains but few extra-European species. All the fossil species we know, are found either in the London Clay or the Calcaire Grossière: a very neat one occurs in the sandy indurated Marle, belonging to the London Clay at Bognor, where it is accompanied by fossil Pinnæ, Lingulæ, &c. We have represented this, believing it to be a variety of Lamarck's *Pectunculus pulvinatus*, but, in truth, it is so difficult to fix the characters of the species in this Genus, that we dare not speak decidedly upon this point.

Fig. 1. Is *Pectunculus pilosus*, of which we have given the outside of one, and the inside of both valves, to show the hinge.

## OSTREA.



TESTA foliacea, irregularis, inæquivalvis; *umbo-nibus* subdivaricatis, ætate inæqualissimis. *Valva inferior* major, concava, adhærens; *superior* minor, planiuscula. *Cardo* edentulus. *Ligamentum* semi-internum, disco subtrigono tripartito in utrâque valvâ, affixum. *Impressiones musculares* in utrâque valvâ duæ, altera magna, suborbicularis, subcentralis; altera minutissima, infra cardinem posita.



THE Genus *Ostrea*, as constituted by Linné, comprehended shells of such diversity of character, that it could not possibly remain entire; and yet, though many perceived the inconvenience of associating regular, sometimes equivalve shells, such as the *Pectines* and *Plagiostomata*, shells attached by a byssus, such as the *Mallei* and the *Pedum*; shells characterized by so singular a longitudinally sulcated hinge as the *Perna*, together with *irregular* and inequivalve shells, such as the true *Ostreæ*, which are withal attached by the outer part of one valve; Bruguière seems to have been the first who attempted to distinguish and characterize the various Genera thus confounded under the common term of *Ostrea*. But Lamarck, though highly approving the judicious and convenient purification to which Bruguière had subjected the Linnæan *Ostrea*, still thought the work incomplete; and, therefore, in order to reduce the Genus to its proper limits, he separated from it the *Vulsellæ*, the *Podopsides* and the *Gryphææ*: the characters, however, by which he would distinguish this last mentioned Genus from *Ostrea*, do not appear to us sufficiently decisive to warrant its separation, wherefore we have not adopted his Genus

## OSTREA.

Gryphæa; but as we are compelled thus to express our dissent from so great authority, we feel called upon also to explain our reasons for such dissent: to do this, we must first mention the particular points upon which Lamarck depends for his distinction between them; these are, first, the apparent regularity of the *Gryphææ*; secondly, their being scarcely, if at all, attached; and, thirdly, the generally large, involute, *spiral umbo* of the lower valve. To the first we answer, that though the *Gryphææ* are in general apparently *more* regular than the *Ostreæ*, they cannot be considered as regular shells, and that they are moreover very variable; secondly, the *Gryphææ*, as well as all other *Ostreæ*, are attached by the umbo of the larger and concave valve, and this particularly in the young state; (in which state, in fact, it is impossible to distinguish between one and the other:) moreover, both become free, as they increase in size; and if the *Gryphææ* are then apparently more regular, it is because in their young state they have lived in situations where they could only become attached to small, regular objects, while the *Ostreæ*, having lived in more rugged and irregular situations, and necessarily remaining attached for a longer time, have partaken more of the irregularity of their native situation: indeed there is sufficient evidence that an oyster, when by any chance it becomes attached to a small, smooth object, where it is comparatively free, becomes also regular in the same degree; thirdly, we cannot approve of the term *spiral*, as at any time applicable to the umbo of the lower valve of the *Gryphææ*; when young it is not *involute*: and though Lamarck mentions the *size* of this, as one important distinguishing mark of his Genus, he gives the characters of several species in which this part is *small*.

Another circumstance, in which the *Gryphæa* is thought to differ from *Ostrea*, has been dwelt upon by some; an obscure lobe or sulcus observable on the right side, particularly of the lower valve; but this is far from being distinct in some species.

All the species of the Genus *Ostrea*, agree therefore in being irregular inequivalve shells, of a laminated or foliaceous structure, the lamina being composed as in *Pinna* of perpendicular fibres: the points of the umbones are not quite close together, sometimes far distant, and they become still more distant, as well as very unequal, by age. The lower valve is larger than the upper, concave

## OSTREA.

and adherent by its umbo in its young state, and sometimes, even until it has attained a considerable size; the lower valve is smaller and rather flat. The hinge cannot be said to have any teeth, though there is frequently near to it a row of small denticulations, but these sometimes extend all round the inner edge of both valves. The two valves are united by a ligament, which as it lies between the umbones, serves to separate them from each other in a small degree, and can therefore be considered as only partly external, though we know not how to say, that it is in anywise internal, but it is not exposed when the valves are closed: the disk or facet to which it is attached, is generally of a subtriangular form; one of the points of its triangle being close to the umbo, which point is rather inclined to one side: this disk is tripartite, being divided by two raised lines which divaricate from the umbo; the central portion is generally the largest and the deepest, but the ligament is attached to all three: but as the shells increase by age the older portions of the ligament, or those nearest the umbo decay and do not serve any longer to unite the two valves; consequently they leave between them a small unoccupied space. There are *two* muscular impressions in each valve, one of which is large, semi-orbicular and nearly central; the other is very small and placed near to the hinge.

The Genera with which *Ostrea* has been, and therefore may still be confounded, are *Crenatula*, *Perna*, *Malleus*, *Pedum*, *Lima*, *Pecten*, and *Vulsella*: from the two first, *Crenatula* and *Perna*, it may be distinguished by its hinge, which in those Genera (if they are really distinct from each other) is composed of a number of longitudinal grooves arranged side by side: from *Malleus* and *Pedum*, by the mode of its attachment, which in them is by a byssus, and not by the outer part of the shell; from *Lima* and *Pecten*, by its being irregular, as well as by the mode of its attachment, for the shells of those Genera are regular and attached by a byssus: and, lastly, from *Vulsella*, by its mode of attachment and by the hinge; for though we believe the *Vulsellæ* are not actually attached, having never observed any opening for the passage of a byssus, yet they generally occur imbedded in sponges; they differ also in the hinge, the central portion in *Vulsella*, forming an internally projecting callosity.



## OSTREA.

The Ostreæ, including Gryphæa, may be conveniently divided into three sections, as follows:

§ 1. *Testa margine simplice, vel subundato.* To this section belongs the common Oyster and such other species as have no distinct folds around the edges.

§ 2. *Testa margine plicato.* To this section belong the Cockscomb Oyster, (*Ostrea Crista galli*, Lam.) and other species whose edges are strongly and sharply plicated. Linné has placed several of them among his Mytili.

§ 3. *Testa umbone majoris valvæ involuto*; and to this section belong the *Gryphææ* and *Podopsides* of Lam.

The Ostreæ, as every body well knows, are marine; in their young state they are attached to rocks and other submarine bodies, frequently to each other; and it is probable that they remain so for a considerable part of their life, though under certain circumstances they seem also to have the power of dislodging themselves, without being afterwards subjected to inconvenience. The outer part of the shells is of an imbricated and foliaceous substance, composed of minute perpendicular fibres, different however from that part of the inside to which the animal is for the most part confined, which is of a much more compact nature, and if composed also of aggregated fibres, they are not placed in the same position, with respect to the animal, as those of the outer part.

There is a circumstance mentioned by Lamarck (but we believe that Lamarck is not the first who made the observation, though if he be not, he has implicitly adopted it from some other conchologist, without giving the author's name) which we should be very glad to pass over in silence; for, either we are so extremely dull as not to comprehend it, or the circumstance, as related, is itself so exceedingly absurd, that we could have wished, for the credit of science, that it had never disgraced the pages of any books on Natural History: that Lamarck may not be misunderstood, we must quote his own words, without attempting to translate them: "Une particularité fort remarquable, qui appartient à un grand nombre d'espèces de ce genre, et qui paroît ne leur être commune qu'avec les spondyles, c'est qu'à mesure que l'animal grandit et vieillit, il est forcé de se déplacer dans sa coquille et de s'éloigner graduellement de la base de sa valve inférieure; or en se déplaçant, il déplace en même temps la valve supérieure de sa coquille, ainsi que le ligament des valves;

## OSTREA.

ce dont aucune autre coquille bivalve n'offre d'exemple, si l'on en excepte les *Spondyles*." Upon this we will make only one or two observations, and leave it to be received or rejected according to the judgment of those who have opportunities of studying more closely the habits of those marine animals. The careful examination of many specimens has not furnished us with any reason for altering our opinion that the Oyster shell is formed, like all other shells, by a deposition of shelly matter from the animal on the inner sides of the valves, consequently that there exists no peculiarity in this respect in the Oyster, inasmuch as if it be necessary for the Oyster to displace itself in its shell, it must also be equally necessary for the animals of *all* other bivalves to do so too; and a common observer will soon perceive that the animals of *all* bivalves recede gradually from the base or umbo of their valves. But Lamarck further mentions the *Spondylus* as another, and the only other example of the above related displacement of the upper valve, to which we have one fact to object, which we think completely decides the inadmissibility of the conjecture (for we suppose it merely a conjecture); this fact is, that the two valves of the *Spondylus* cannot be separated without breaking the hinge teeth, consequently, unless the animal damages the teeth of its shell, there can be no displacement of the upper valve.

We believe there exist a considerable number of species of this genus; but the irregularity of the shells renders the determination of the species extremely difficult. The fossil species are found in almost all the strata down to the Lias; the species are however so extremely difficult to recognize, that, with one or two exceptions, we dare not venture to indicate positively those which are peculiar to certain strata.

The *Ostréa deltoidea*, Sowerby's Mineral Conchology, tab. 148. is characteristic of the Kimmeridge Clay, or Oak-tree Clay of Smith. The *O. pulchra*. Min. Con. tab. 279. appears also to characterize a portion of the Plastic Clay. The *O. (Gryphæa) dilatata* occurs in the Kelloways and Clunch Clay, and the *O. (Gryphæa) incurva* in the Lias.

## FIRST SECTION.

First Plate, Fig. 1. *Ostrea edulis*.

2. ——— *Virginica*.



## OSTREA.

### SECOND SECTION.

- Second Plate Fig. 1. *Ostrea carinata*, Lam.  
2. ——— *Crista-galli*.  
3. ——— *Folium*.

### THIRD SECTION.

- Third Plate, Fig. 1. *Ostrea (Gryphæa) angulata*, Lam.  
2. ————— *incurva*, Sowerby.  
3. ————— *dilatata?* jun.

## MALLEUS.



TESTA irregularis, subæquivalvis, bysso adhærens, elongata, basi plerumque lobis lateralibus duobus. Umbones divaricati. Cardo edentulus. Ligamentum externum, areæ trigoni obliquæ in utrâque valvâ, fossulâ centrali, obliquâ, elongatâ, affixum. Sinus byssi in valvâ inferiore ponè cardinem positus. Impressiones musculares in utrâque valvâ duæ, altera magna, subreniformis, lateralis; altera minutissima, infra cardinem posita.

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FEW Genera are so well characterized as *Malleus*; the species which compose it were placed by Linné among the *Ostreæ*, with which indeed they agree perfectly well in the structure of the external foliaceous portion of their shells, but from which they may nevertheless be easily distinguished by the mode of their attachment, which in *Malleus* is by a byssus passing through a sinus behind the hinge in the lower valve; as the shell increases, this sinus is covered over, in some species, with shelly matter, so that the byssus then passes through a small aperture in the lower valve, near to and behind the hinge; sometimes also there is a small sinus in a corresponding situation in the upper valve, forming with that in the lower valve (when both valves are closed), a small aperture through which the byssus passes. There is only one other Genus with which this can be confounded, the *Pedum*, of which we have already mentioned the distinguishing Character.

Shell irregular, nearly equivalve, elongated, its base frequently furnished with two, sometimes much elongated, lateral lobes, one on each side; sometimes there is only one of these, and some species have none at all, so that the name of *Malleus* or *Hammer Oyster*, is not happily applicable to all the species of the Genus, though particularly

## MALLEUS.

so to two or three of them. There are no teeth in the hinge, and the *umbones* do not lie close together. The ligament is for the most part external, lying between the beaks, and attached in each valve to a triangular oblique area or disk, with a central and, also oblique elongated furrow, to which the principal portion of the ligament is attached, though it is also spread over the two lateral portions.

The muscular impressions are two in each valve, one of them is large, rather reniform and lateral, the other is indeed very small, but it is also very distinct, and placed near to and below the hinge on the side towards the sinus for the passage of the byssus. This small muscular attachment exists, also in several, if not all the other Genera included by Lamarck in the *Monomyaires*: it was first pointed out by Mr. I. D. C. Sowerby, in this Genus, as well as in *Ostrea*.

The *Mallei* are marine, and we believe all extra-European; they are valued by Collectors, on account of the singularity of their form and their rarity. In almost all of them the imbricated foliaceous outside is extended very far beyond the part which includes the animal, both towards the apex and on the lateral lobes; it is undulated at its edges, and in the centre is a rather irregular blunt longitudinal ridge. We are not aware of the existence of any fossil species.

Fig. 1. *Malleus vulgaris*.  
—— *normalis*, Lam.

## CONCHOLEPAS.



TESTA oblonga, *spirâ* brevissimâ; *apertura* amplâ, fere magnitudinem testæ æquante, basi levitèr canaliculatâ, processibus duobus brevibus instructâ: peritremate continuo. *Labium* internum reflexum. *Impressiones musculares* duæ, altera subcolumellaris, altera in interiorem labii externi partem descendens.



IN his *Système des anim. sans vertebr.* Lamarck has placed the Concholepas among those Genera which he has formed out of the Linnæan Patella, though he mentions the fact of the animal being provided with an horny operculum. We were for a long time disposed to accord with Lamarck in assigning it a place near to the Patelliform shells, principally because we found in it two very distinctly marked muscular impressions, in all respects bearing a strong resemblance to *some of them*; and further, because the evidence we possessed at the time of the existence of an operculum was very insufficient. We have since learned that these muscular attachments exist also in the Purpuræ, and in many, if not all, univalve shells: and though we have never seen the operculum, we are compelled to believe the fact of its existence, for Bruguière mentions having seen many specimens with their opercula, brought by Dombey from the coast of Peru; guided by this circumstance, and also by its outward appearance, he has perhaps judged more correctly in placing it among his Buccina, in which also it was included by Linné, Gmelin, &c. it certainly is very nearly related to Purpura. An extremely large aperture, and the spire placed near to its edge, in the opinion of De Montfort, would naturally bring the Concholepas near to the Patella and other nearly cognate Genera, if the sinus, or short canal at the base of the

## CONCHOLEPAS.

aperture did not form the passage between those shells, whose aperture is entire, and those which have a canal at their base.

In its general form the shell is oblong; its spire is very short, not produced beyond the last volution, and it must be remarked that the number of volutions scarcely exceeds three: its aperture, almost as large as the shell itself, is formed into a short canal at its base, close to which there are two short processes at the lower part of the outer lip: the peritreme is continuous, that is, there is no separation between the outer and inner lip at the upper part, for the inner lip does not lie close to the last whorl, but is only reflected towards it. There are two distinct muscular impressions, one placed upon the inner part of the columella, and the other, which is very large, descending from the upper and inner part of the spire to about three-fifths of the distance towards the base of the inner part of the outer lip. On the outside, the shell presents imbricated ribs, or *costæ*, radiating from the spire to the edge of the outer lip, which is consequently crenated; the lowest of these is very large, and forms the external part of the canal. The operculum, according to Bruguière, only closes a small part of the aperture; it is thin, horny, oval, and of a dark brown colour, its centre is thicker than its edges, and marked with very close-set transverse striæ.

The Concholepas is marine: only one species, the *C. Peruviana*, is known, which is an inhabitant of the Peruvian Coast; very little is known with certainty of its animal inhabitant, but, judging from analogy, we should think it bears a near resemblance to that of *Buccinum*, *Murex*, *Purpura*, &c. We do not know of any fossil species.

## TEREBELLUM.

—◆◆—  
*Lam.*—Ann. du Mus. xvi. p. 300.  
 —◆◆—

**TESTA** univalvis, convoluta, subcylindrica, apice acuto. *Apertura* longitudinalis, supernè angustata, *basi* emarginata. *Columella* lævis, truncata.

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ESTABLISHED by Lamarck, and adopted by succeeding conchological writers, but divided by Montfort, who, on account of its *hidden* spire separated from it, the species named *convolutum* by Lamarck, under the name *Seraphs*. In doing so, he has been followed by the Author of “The Mineral Conchology of Great Britain;” but as we are not convinced of the necessity of doing this, and as we particularly object to the needless multiplication of Genera, we are obliged to dissent, and include Montfort’s *Seraphs* in one Genus, with Lamarck’s *Terebellum*. The shell called by Linné, “*Bulla Terebellum*,” is the type of this marine Genus, of which there are but very few species, either recent or fossil; the only recent one with which we are acquainted is a very pretty whitish shell, or elegantly variegated with brown marks; or sometimes with brown zigzag lines or dots.

The *Terebellum* has no epidermis: it is described by Lamarck as a thin shell, rolled around its longitudinal axis in the form of an elongated cone, almost cylindrical and pointed at its summit; its aperture is longitudinal, narrow at its upper extremity, but more expanded below and notched at its base; its outer lip is entire and not thickened, or at least very slightly; its columella smooth and truncated at its base; and when the outer part of the shell is observed, it appears irregularly notched at the base.

The *Terebellum subulatum* of Lamarck, (*Bulla Terebellum*, Linn.) has a distinct, but short spire, consisting

## TEREBELLUM.

of only two or three volutions: the apex of its aperture is continued in the form of a very narrow spiral canal, separating the volutions. Next to this we should place the species named *T. fusiforme*, in "Sowerby's Mineral Conchology, t. 287, (which, however, is not the same as Lamarck's *T. fusiforme*,) this, instead of the *spiral* canal above mentioned, has the apex of its aperture continued in the form of a straight narrow canal, extending rather more than half way towards the apex of the shell: this we consider as intermediate, in point of peculiar specific character, between the *T. subulatum* and *T. convolutum*, in which last species the spire is generally quite hidden, (sometimes slightly apparent, and then having a spiral canal separating the volutions,) but this we conceive to be effected by a continuation of the upper part of the whorls covering the spiral line; because, if a specimen be broken so as to expose the inside, the spiral line is there very distinct, which fact is also demonstrative evidence, that Lamarck's *T. fusiforme* is only a cast of the inside of *T. convolutum*.

We think we have thus shown the impropriety of following Montfort, by adopting his Genus Seraphs; the *Terebellum fusiforme* forms so natural a connecting link between the *T. subulatum* and *T. convolutum*, that if we adopt his Genus Seraphs, we should be under the absolute necessity of separating *T. fusiforme* under a new generic appellation, which we think would not at all further the interests of conchological science.

The animal of this Genus is not known, it is an inhabitant of the Indian Ocean. Lamarck thinks the shell nearly related to the *Ancillæ*, the *Olivæ* and the *Coni*, but the smooth and truncated Columella distinguishes it from all three: it cannot be confounded with the *Cyprææ* in their young state.

Besides two varieties of *T. subulatum*, we have given one view of *T. fusiforme*, to shew the canal into which the upper end of the aperture is produced; and a front view of a specimen of *T. convolutum*, the type of Montfort's Genus Seraphs.

Fig. 1. 2. *Terebellum subulatum*.

3. ——— *fusiforme*.

4. ——— *convolutum*.

## CHAMA.



TESTA irregularis, plerumque suborbicularis, inæquivalvis, adherens, umbonibus inæqualibus, distantibus, involutis. *Cardo* dente unico crasso, obliquo, subcrenato, fossulæ valvæ oppositæ inserto. *Impressiones musculares* duæ, distantes, laterales. *Ligamentum* externum, divaricatum, sub umbonibus revolutum.



Linné had united in his Genus Chama, shells so different from each other, that the association could not possibly be preserved, for in his arrangement regular and inequivalve shells are placed with such as are irregular and inequivalve; free shells with others that are attached to marine bodies; and shells which have two distinct muscular impressions with others which have only one. Indeed it is very observable that the greater number of the shells arranged together by Linné do not correspond with the generic character he has drawn out for them, wherefore Bruguière has divided Linné's *Chamæ* into several Genera, to which Lamarck has added some others. We now give that to which the name of Chama is retained, which are irregular, thick, generally very inequivalve shells, for the most part covered with irregular spines, or foliated on the outside in the same manner as many *Ostreæ*: the umbones are also irregular, distant, unequal in size and involute; one of them, (that of the attached valve) is salient at the base of the shell, and sometimes projects very far beyond it, the other is generally turned over upon its valve, so as to appear as it were imbedded in it. Lamarck has divided the *Chamæ* into two sections, in the first of which the umbones turn from left to right, and in the other from right to left, in both sections taking the attached valve as the lower one: this circumstance arises from the remarkable peculiarity in some of the species to attach them-



## CHAMA.

selves by one valve, and in others to fix themselves by the other valve. The *Chama damicornis* belongs to the first, and the *C. Arcinella* to the second. This last species is also remarkable for being nearly equivalve, and for the regularity of its spinous processes, as well as for the smallness of the attached portion and the proximity of its umbones, for which reason it shows but indistinctly the divaricated ligament. There is one strong, irregular, oblique, thick, striated, generally crenate, hinge tooth in one valve, which is received into an irregular, also striated, groove in the other valve. There are two distant, lateral, muscular impressions in each valve, and the line to which the mantle is attached is entire. The ligament is external, divided into two segments at its posterior extremity, one of which is decurrent to the point of the umbo in each valve.

There are several recent species of this Genus, one of which, the *Chama Lazarus*, is extremely variable; indeed, the general resemblance of one species to another, and the numerous varieties of each, renders it extremely difficult to determine the species. Of fossil species there are many, some of which vie with the recent in the singularity of their external spinous foliations, though not in the beauty of their colouring: several are described and figured by Lamarck in his account of the Fossil Shells of the neighbourhood of Paris, as well as in "*Sowerby's Mineral Conchology*." They are found in the London Clay, and *Calcaire Grossière* also in the Chalk and Green sand.

On account of the similarity between this Genus and *Diceras*, we shall be expected to explain the characters by which this latter is distinguished from *Chama*, with which, indeed, it is arranged by Bruguière; these, according to Lamarck, are the large, conical, diverging, spiral umbones, and the large, concave, subauriculate, prominent tooth in the large valve of the *Diceras*. Not having ourselves seen the hinge of *Diceras*, we will not venture to offer an opinion; but judging from the specimens we possess, we see in *Diceras* a sort of connecting link between *Isocardia* and *Chama*, having both the *umbones* free and involute, and being moreover a nearly equivalve shell, like *Isocardia*; but being attached by one valve, and not *quite* equivalve; in these respects resembling *Chama*. As the *Diceras* is only known in a fossil state, it is impossible to ascertain the comparative anatomical characters of the animal.

## ISOCARDIA.

—◆◆—  
*Lam.*—Hist. Nat. des Anim. sans vert. vi. p. 30.  
 —◆◆—

TESTA æquivalvis, cordata, ventricosa ; umbonibus distantibus, divaricatis, involutis. *Dentes cardinales* duo, compressi, intrantes, unus sub umbone recurvus. *Dens lateralis* anticus, elongatus. *Ligamentum* externum, divaricatum, segmentis sub umbonibus decurrentibus. *Impressiones musculares* duæ, laterales, distantes.

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ARRANGED by Linnè in his Genus *Chama*, and by Bruguière among his *Carditæ*, but dissevered from both by Lamarck, and we think with reason, because its involute, divaricate *umbones*, and its, consequently, dichotomous ligament running in each valve to the point of the umbo, serves to distinguish it from Bruguière's other *Carditæ*. The same circumstances serve as good discriminating marks between *Isocardia* and all other bivalves, if we except Bruguière's *Chama*, and Lamarck's *Diceras* ; but these are both inequivalve, and attached by the outside of the shell ; there is therefore no danger of its being confounded with them.

The two valves of *Isocardia* are alike : when closed, so that both the umbones are seen in front, they have a cordate general form, and are each of them very ventricose : their umbones are distant, turned backwards and involute. Cardinal teeth two in each valve, compressed ; that one nearest the apex turned in under the umbo. There is only one lateral tooth in each valve, which is also compressed and elongated, and is placed just before the ligament, which is external, divided into two segments at its posterior extremity, one of which is decurrent to the point of the umbo in each valve. There are also in each valve two lateral, distant, muscular impressions.

## ISOCARDIA.

Very few recent species of this genus are known; we have given representations of two of them, the *Isocardia Cor*, and *I. Moltkiana*; the *I. Cor* (*Heart Cockle* of Collectors, *Chama Cor*, *Linn.*) is frequent in the Mediterranean, and occurs on some parts of the British coasts, particularly in Berehaven, where it grows to a large size; when in good condition, it has a thickish, dull brown epidermis, beneath which the shell is prettily marked with faint brownish zigzag lines: the *I. Moltkiana* is an East Indian and Chinese shell of far greater rarity—it is transversely grooved, and has a longitudinal anterior keel. Lamarck describes one other recent species.

Several Fossil species are given in plate 295 of "Sowerby's Mineral Conchology," one of which is from the London Clay, and another from Kelloway's:\* according to Brocchi (*Conch. Foss. subap. II. 520*) two varieties of *I. Cor* are found in a fossil state in several parts of Italy; but as a subject upon which much diversity of opinion exists is here brought into question, we should recommend an attentive and comparative re-examination of the fossil with recent specimens, before we come to an absolute decision upon this point. Another fossil species is found at Piacenza, the *I. arietina*, Lam. We have represented the *I. Basochiana* (*Defr. Dict. des Sciences Naturelles*), a new and rare species, found in a yellowish limestone by M. De Basoches de Falaise, in the district of *Coutances*. We think we may venture to express our opinion that all the fossil specimens published in various books, and existing in various collections, are not distinctly characterized *Isocardia*, but only the casts of the insides of other bivalves: the best distinguishing character is in the groove formed for the extension of the ligament from the hinge to the umbo. It is incumbent on us to mention that in *Isocardia*, the line to which the mantle is attached, passing from one muscular impression to the other, is entire.

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\* A fossil species also occurs in the "*Crag*," which so nearly resembles the *I. Cor*, that we know not wherein the specific difference consists.

## IRIDINA.

Lam.—Hist. Nat. des Anim. sans vert. vi. p. 89.

TESTA æquivalvis, inæquilatera, transversa, umbonibus parvis, subrectè inflexis. *Cardo* elongatus, linearis, versus medium attenuatus, per longitudinem tuberculosus, subcrenatus, tuberculis inæqualibus, crebris. *Impressiones musculares* tres, irregulares, laterales, duæ posticæ; tertia magna, antica, remota. *Ligamentum* externum, marginale.

THE only species of this Genus at present known was arranged by Bruguière among his *Anodontites* (*Anodon*, Swainson), and it is certainly so nearly related to them, that Lamarck thought Bruguière might be authorized in uniting it to them: nevertheless its hinge line, tubercular throughout its length, is in that respect so singular, that Lamarck has made it the type of a particular Genus.

Shell equivalve, inequilateral, transverse; umbones scarcely distinct, but nearly straight. *Hinge margin*\* long, linear, attenuated towards the umbones, consisting of subcrenated, unequal, small, close-set tubercles throughout its length. Muscular impressions three, lateral, irregular, two of them placed at the posterior side, one of these being much smaller than the other, and anterior to it; the third, large, placed at the opposite or anterior side of the shell. Ligament external, long, marginal.

According to Lamarck, the *Iridina elongata* is found in the rivers of warm climates; it is a transversely oblong

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\* A term adopted from Swainson.

## IRIDINA.

shell, smooth on the outside, showing the striæ of growth distinctly; it is rather a strong shell, coated with a thick dark olive green epidermis, beneath which the outer shelly coat is opaque, whitish, and dull, but immediately beneath this and within the shell, is of a brilliant reddish pearly lustre, reflecting the colours of the rainbow. The *umbones* are commonly eroded, as in the greater number of fresh-water shells. This is a shell of very great scarcity, and consequently very highly valued.

## SOLENIMYA.\*

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*Lam.*—Hist. Nat. des Anim. sans vert. vi. p. 488.

◆◆◆

TESTA inæquilatera, æquivalvis, transversim oblonga, extremitatibus obtusâ, epidermide nitidâ, marginem superante. *Umbones* non prominuli. *Dens cardinalis* in utrâque valvâ, dilatatus, compressus, perobliquus, supernè subconcausus, ligamentum excipiens. *Ligamentum* partim internum, partim externum.

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IN introducing to our readers a shell of such extreme rarity and singularity as the *Solenimya*, we feel ourselves incapable of doing better than translating the short, but excellent account given by Lamarck, who has instituted the Genus from an acquaintance with two recent species, the one from New Holland, and the other from the coasts of the Mediterranean. Lamarck says, “At first sight the *Solemyæ* resemble the *Modiolæ*, nevertheless their characters bring them near to the *Solenes*, and still nearer to the *Anatinæ*. They are slender, transversely oblong, almost cylindrical or depressed cylindrical shells, obtuse at the extremities, and furnished with distant, diverging rays, which run from the umbones, and terminate at the upper edge of the valves, and at the lateral extremities. They are covered with a brown, very shining epidermis, the edges of which pass beyond the edges of the shell, being lacerated, particularly towards the anterior side. These shells do not gape at their posterior extremity, and only slightly at the anterior. The two cardinal teeth, (one in

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\* Lamarck's term *Solemya* has been strongly objected to; Bowdich has changed it to *Solenimya*, which we gladly adopt.

## SOLENIMYA.

each valve) which receive the ligament, have a callosity running beneath each of them; but the ligament enclosed between the tooth and the edge of each valve, shows itself also on the outside, enveloping the edge of the valve."

Thus far Lamarck; we have only to add, that besides the two recent species which he describes, there is found in the Calcaire Grossière, in the neighbourhood of Valognes, a small fossil species which we have named *S. parvula*, and represented in our plate; in its general form it approaches very nearly to the *S. mediterranea*, but it is notched at the umbo, a character in which it resembles the *S. australis*, which, however, we have never seen. We therefore decline giving a specific character of *S. parvula*.

Fig. 1. 2. *Solenimya mediterranea*.

3. ——— *parvula*.

Shell inequilateral, inequivalve, transversely oblong, obtuse at the extremities, covered with a shining epidermis extending beyond the shell. Umbones not prominent, scarcely distinct. A dilated, compressed, very oblique cardinal tooth in each valve, slightly concave above, receiving the ligament. Ligament partly interior, partly exterior. Two distant, irregular, lateral muscular impressions.

## LIMNEA.



Lam.---Hist. Nat. des Anim. sans vert. T. 6. pt. 2. p. 157.



**TESTA** oblonga turrita, interdum elongata; *spirâ* semper exsertâ. *Apertura* integra, longitudinalis, *Labium externum* acutum, infernè ad sinistrum revertens, et in plicam columellarem ascendens. *Labium internum* plus minusve dilatatum.



AGAIN we are obliged to express our dissent from the opinion of Lamarck, who has put at the head of the species of his own Genus *Limnea*, the *Helix Columna* of Gmel., &c. calling it *Limnea Columnaris*, although it is sufficiently distinguished from all the *Limneæ* by its peculiar characters, which, indeed, bring it much nearer to *Achatina*; wherefore, we think De Ferussac has arranged it in a much more natural situation after the *Achatina*, though, at the same time, he expresses some doubt about the propriety of placing it there, on account of his being unacquainted with its animal; indeed we are not surprized at this, for the shell is so singular, that, without a knowledge of its animal, we cannot hope to arrive at certainty in placing it. It is however a land shell, there can therefore be no doubt but that the animal differs essentially from that of *Limnea*.

The Genus *Limnea* was established by Lamarck, having been previously included by Bruguière with his *Bulimi*, and by Linné and Linnæans in *Helix*; if we except the shell we have mentioned above, it appears to us to be a very natural Genus.

The *Limneæ* are of an oblong general form, their spire is always apparent, and sometimes elongated and



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acutely turrited. In most of the species the *aperture* is large, longitudinal, and entire, that is, not emarginate, nor does the lower part of the last volution ever form a considerable sinus in the upper and left side of it: it is generally rather narrower at its upper than at its lower extremity. The outer lip is sharp-edged; it turns to the left at its lower part, and then ascends and spreads more or less over the ventricose lower part of the last volution, covering the columella, and forming with it an oblique obtuse fold. The external part of the shell is smooth, sometimes polished.

In all the above characters, we find the Genus *Physa*, of Draparnaud, agrees perfectly; we know of only one mark of discrimination in the shells themselves, it is that the *Physæ* are *heterostrophe* shells; but since we know many instances of *heterostrophe* monstrosities in various genera, this surely cannot be considered a good generic distinction. Accustomed as we were to receive and adopt many Genera without sufficient examination, we could not have anticipated this difficulty, for we thus find ourselves obliged either to unite two genera which have appeared distinct to Lamarck and Draparnaud, and which have been adopted by some succeeding writers, or, contrary to our wishes, and as we think to the interests of conchological science, we must not only continue to separate the *Physæ* from the *Limneæ*; but we must also adopt Fleming's *Aplexa*, and Leach's *Myxas*, each of which would, as far as we yet know, only contain one species. These are all fresh-water shells; and the only describable difference in the shells, except mere specific differences, consists in the *Aplexa* and *Physa* being *heterostrophe* shells, while the *Limnea* and *Myxas* are *dextral*. Greater differences are found in the animals, chiefly in their tentacula, and in their mantles; the *Myxas* of Leach, and the *Physa* of Draparnaud, having the power of extending the edges of their mantle over a large portion of the external part of their shell, which the *Limnea* of Lamarck, and the *Aplexa* of Fleming have not, while the tentacula of all, but *Physa*, are compressed and triangular, and even in *Physa* they are compressed according to Lamarck, though filiform: in all of them the eyes are found at the internal base of the tentacula, supported on very short tubercular pedicles.

The facts we have mentioned above, induce us, therefore, to unite the whole of these shells under the generic

## LIMNEA.

appellation of *Limnea*; they may be divided into four sections, as follows :

§ 1. Testa tenuissima, subglobosa, polita; labio interno dilatato; aperturâ ovatâ, dextrâ. Animal—Pallium reflexum. Tentacula brevia, trigona. *Myxas*, Leach's M. S. *Helix glutinosa*, Mont. *Limnea glutinosa*, Drap. Tab. nost. f. 5.

§ 2. Testa tenuis, obovata, polita: labio interno dilatato; aperturâ ovatâ, vel ovato-lanceolatâ, sinistrâ. Animal—Pallium reflexum; tentacula subulata. *Physa*, Drap. *Bulla*, Linn.

§ 3. Testa tenuis, oblonga, polita; labio interno externum adæquante; aperturâ lanceolatâ, sinistrâ. Animal—Pallium non reflexum: Tentacula trigona. *Aplexa*, Fleming: *Physa*, Drap. *Bulla hypnorum*, Linn.

§ 4. Testa tenuis, plerumque oblonga, solidiuscula; aperturâ ovali dextrâ. Labio interno externum adæquante. Animal—Pallium non reflexum. Tentacula compressa, trigona. *Limnea*, Lam.; *Helix*, Linn.

The shells of this Genus are inhabitants of rivers, ditches, fresh-water lakes, and stagnant pools, throughout Europe, and in all other parts of the world, particularly in North America, where the late researches of Naturalists have led to the discovery of several species: in the East Indies also, several undescribed species have been lately found; we have given engravings of some of these. The common English species are the *L. stagnalis*, *auricularia palustris*, and *peregra*; *L. elongata* and *L. glutinosa*, are scarce and local: *L. fontinalis* and *L. turrita* (*Bulla fontinalis* and *hypnorum*, Linn.) are not unfrequent: besides these we have some other species of less note.

Several fossil species of this Genus occur abundantly in company with various Paludinæ and Planorbes in the fresh-water formations: these are found in the neighbourhood of Paris, and in the upper and lower of those formations at Headen Hill, and in other parts of the Isle of Wight: we have also found them sparingly in the mixed stratum commonly called the "upper marine formation" between the two; but we believe they do not occur in any other.

Mr. I. E. Gray has favoured us with the two following species of *Limnea* from the East Indies, which he has named and characterized as follows:

1. *L. rufescens*; testa oblongo-lanceolata, tenuis, hyalina, purpurascens-rufescens, anfractibus quatuor. Spira brevissima, acuta, suturis perobliquis. Apertura lanceolata, elliptica. Columella obliquissima. Tab. nost. f. 2. *Limnea acuminata*? Lam. vi. pt. 2 p. 160.

*Obs.*---In its general form this shell is not ovato-ventricose, we therefore cannot cite Lamarck with any cer-

## LIMNEA.

tainty. It becomes pale horn-colour and white when exposed. Diameter to the length as 6 to 13.

2. *L. ovalis*; testa ovalis, pellucida, pallidè cornea: concinnè transversim striata, anfractibus 5. Spira brevissima, acuta, suturis fere horizontalibus. Apertura ovalis, elliptica. Tab. nost. f. 4.

*Obs.*—Diameter to the length as 5 to 9.

Fig. 1. *Limnea stagnalis*.

2. ——— rufescens, *Gray Syst. Mollusc. ined. et supra.*
3. ——— fusiformis, *Min. Con. t. 169. f. 2. 3.* a fossil species from  
Headen Hill.
4. ——— ovalis. *Gray, ut supra.*
5. ——— glutinosa.
6. ——— elongata, *Drap.*
7. ——— (*Physa*) castanea, *Lam. vi. pt. 2. p. 156.*
8. ———, ——— fontinalis.
9. ———, ——— rivalis—a species which has been admitted into  
the English catalogue, but we only know it to be found in Gua-  
daloupe.
10. ———, ———, turrita, *Lam. (Bulla hypnorum, Lin.)*

## GLYCYMERIS.



TESTA æquivalvis, crassa, transversa, utroque latere valdè hians; epidermide nigra induta. Epidermis testæ marginem superans. *Cardo* callosus, edentulus. *Nymphæ* prominentes. *Ligamentum* magnum, prominens, externum. *Impressiones musculares* duæ, irregulares, distantes, impressione musculi adhærentis pallii conjunctæ.



THE Genus before us offers such an unusual assemblage of characters, that we are surprized no one before Lamarck should have described it as constituting a Genus distinct from all others. In conjunction with *Ponôpæa* and *Solen*, he forms with it his family of *Solenaceæ*; we should have been pleased to have seen *Solenimya* also united to that family, if, indeed, *Glycymeris* be well placed there; for *Solenimya* appears to us to be much more nearly related to *Glycymeris* than to either *Ungulina* or *Amphidesma*.

Shell equivalve, transverse, thick, gaping widely at both sides, in such a manner that the two valves can only touch each other, when closed, at two points, at the hinge and at the upper posterior edge. It is covered with a strong black epidermis, which passes over the edge of the shell where it becomes thinner and is of a lighter colour: this epidermis is generally destroyed from the region of the umbones. There are no teeth to the hinge, but the part to which the ligament is attached is a strong, oblong, prominent callosity. The ligament itself is external, large and prominent. There are in each valve, two distant irregular muscular impressions, which, though distant, are connected by the impression of the muscle by which the mantle adheres to the shell, in which there is a small sinus close to the anterior muscular impression, indeed, the two lateral muscular impressions and the mus-

## GLYCYMERIS.

culâr impression of the mantle are so similar and confluent, that the shell might be said to have one muscular impression running round its inside, except towards the hinge.

Until Lamarck observed the distinctions, the shell which we have figured as the type of this Genus was arranged with the *Myæ* under the name of *M. Siliqua*: but, as he well observes, its hinge is not like that of the *Myæ*, nor that of the *Uniones*, which were also called *Myæ*: having an external ligament, and being destitute of teeth. The situation of the ligament and the want of teeth, distinguishes it also from *Solen*; to which, however, in our opinion, it does not bear a very near resemblance: we cannot at present offer a conjecture as to its proper situation in a Conchological System. Lamarck says, the shells of this Genus are marine; he describes two recent species and one fossil from Grignon.

## LITHOTRYA.



**TESTA** irregulariter subpyramidalis, lateribus compressis, *pedunculo* tubuloso, tendineoque imposita, octovalvis; *valvis* contiguïs, inæqualibus, lateralibus sex, *inferioribus* minimis; *dorsali* magnâ, ligulatâ, *anticâ* minutissimâ. *Appendix* testacea patellam inversam referens, ad basim pedunculi. *Animal* intermedium inter *sessiles* et *pedunculatos* *Cirripedes*, saxorum cavos, ab ipso terebratos, incolens.



WE are happy to have an opportunity of introducing to our readers a new Genus, partaking of the peculiarities of both Lamarck's orders of *Cirripedes*, being pedunculated like *Anatifa*, &c. but having at the base of the peduncle a shelly appendage, analogous to the testaceous base of *Acasta* and *Balanus*, and possessing besides, a peculiarity not to be found in any hitherto described Genus of this class, that of penetrating stones for its habitation. This Genus is an instance among others in proof of the necessity of an acquaintance with the animals inhabiting and producing shells, and of the importance of an intimate knowledge not only of their forms and external characters, but also of their habits and economy; inasmuch as a knowledge of the shelly portions of it alone, would convey to us but a very imperfect idea of the subject; it would present to us a few irregular and dissimilar valves which we should not know how to place so as to describe their relative situations; we have even known instances in which various detached parts of some of the shells of some *Cirripedes* have been mistaken for bivalves, as the base of *Acasta* might very easily be for a *Patella*. Linné united into a single Genus all the shells which compose Lamarck's class *Cirripedes*, because, although there is so great a diversity among the shells themselves, he has well observed

## LITHOTRYA.

the general resemblance which the animals bear to each other, and the analogy which exists between the shelly valves of the various species. Bruguière has also done well in separating the pedunculated from the sessile Cirripedes, under the Generic name *Anatifa*; but we are indebted to Dr. Leach for a more complete elucidation of the class, and a systematic division of it into orders and Genera, most of which being formed from a consideration of the peculiarities in character and habits, are natural and well characterized. Lamarck has followed Bruguière in his "Système," but in his Hist. Nat. des Anim. sans vert. he has rather followed Leach, omitting some of his Genera, so that upon the whole we may consider the arrangement of this class as well established, and we gladly acknowledge the obligations we are under to all the above-mentioned writers, and cannot withhold from them the tribute of our praise, which they so justly merit; but at the same time, we must mark our disapprobation of the arrangement of a later writer, who has dissevered "*Otion*" from this Class, and placed *Chiton* and *Chitonellus*, between it and *Anatifa* because it has only two testaceous valves, thereby doing a sort of violence to nature, in order to harmonize his system, and arrange all bivalves together.

The Genus we are now about to describe belongs to the pedunculated Cirripedes, and it might with great propriety be placed at the beginning of that order, because it has several peculiarities in common with the sessile Genera, particularly the shelly base, and, considering some of the valves as analogous to what is by common consent called the operculum of the Balani, we must, nevertheless, regard the dorsal valve, the small lateral inferior valves, and the still smaller anterior valve, in this Genus particularly, as analogous to those valves in *Balanus* that are united together in the form of a cone, and form the external covering of the animal, but which are here raised upon the peduncle, and partly surround the base of the operculum.

Shell, of a somewhat irregular pyramidal form, with compressed sides, fixed upon a tubular, tendinous peduncle, and surrounded by a few rows of very small scales at the top of the peduncle, which is covered all over by a great number of still smaller scales. Valves eight, contiguous, unequal in size; the two anterior pairs which surround the opening for the passage of the ciliated tentacula of the



## LITHOTRYA.

animal, and which may be compared to the operculum of the Balani, are grooved at their bases, and covered with minute impressed dots; the inferior lateral valves very small, approximated to the dorsal one, which is the largest of all, and of the same width at its extremity as at its base, generally transversely sulcated and dentated at its edges, the anterior valve placed at the lower part of the aperture and very minute. It has an irregular, shelly, cup-shaped or inverted patelliform appendage, to the inside of which the base of the peduncle is attached, and by which it is fixed to the bottom of a deep regular cavity, undoubtedly the work of the animal in a limestone rock. We cannot undertake to explain the manner in which this animal pierces the tubes in which it takes up its abode, but, inasmuch as all the specimens we have seen, amounting perhaps to more than twenty, are all *attached* by the same means to the innermost extremity of the same shaped holes, the larger specimens having proportionably large holes; we are compelled to believe that the animal possesses the means of perforating calcareous stones, and we do not think them bored, because they are rather elliptical, besides which, we have formerly met with an animal of the same nature, (probably of the same Genus) having also a shelly base, inhabiting similar perforations in Oyster shells brought from the Red Sea by the Earl of Mountnorris: unhappily we have not the opportunity of comparing these, having given our specimens to Dr. Leach some years ago.

In plate 166, f. 5, of the *Encyclopédie Méthodique*, is a representation probably intended for one of these animals, but its shelly base is not distinguished; and although it shows the grooves in the dorsal valve, it is not in other respects very good\*.

Of course we have never yet seen any fossil remains of this Genus; indeed among fossil remains those of the pedunculate Cirripedes are remarkably scarce, they occur, however, in the Crag of England, and the calcareous sand of the neighbourhood of Paris.

The specimens we have figured are from Montserrat, one of the Antilles; Mr. Charles Dubois has obligingly favoured us with them.

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\* Upon further examination, we find this figure is copied from Solander and Ellis, pl. 15, f. 5, where we are told that it is a *Lepas* from the Mosquito Shore, and a good Latin specific character is subjoined; we have adopted the specific name *dorsalis* from that work.



...which may be compared to the operation of  
the piston in the cylinder of an engine, and covered with  
the inferior lateral valves, very  
...the lateral

...at its edge  
...of the aperture  
...the aperture

...and by which it  
...the aperture

...the aperture

...the aperture

...the aperture

...the aperture

...the aperture

...the aperture

...the aperture

...the aperture

...the aperture

## ANOSTOMA.



Fischer Tabulæ Zoognosiæ.

*Lam.*—Anim. sans vert. vi. p. 2, 100.



**TESTA** orbicularis, sublenticularis, spirâ convexâ, obtusâ. Apertura semilunaris, sursùm, supra spiram, reversa, utrinque dentata. *Labium externum* incrassatum, reflexum, *internum* supra spiram expansum.



THE peculiarity which distinguishes this Genus from all the other heliciform univalves is so extraordinary, that it appears to us to be deserving of particular notice, inasmuch as it evidences a considerable alteration in the habit and economy of the animal which produces it, at the time of its arrival at its last period of growth, when it forms the reflected outer lip and the teeth in the aperture; until then the animal must crawl about, like other snails, with the spire of its shell uppermost; but as soon as it arrives at maturity and is about to form its complete aperture, it takes a reverse position, and afterwards constantly carries its spire downwards. Our ignorance of the peculiar mode of life and habitation of this animal may tend to make this fact appear the more singular, whereas if we had the opportunity of ascertaining these, we should, perhaps, find that it is only a wise provision of nature for the safety of the animal or the perpetuity of the kind. In other respects, the shell bears a strong resemblance to the *Helices*, for which reason Linné has classed it with them; doubtless, the animal also nearly resembles that of *Helix*, though we cannot here speak with certainty, because we have never seen it, nor do we believe, that there is either description or figure of it extant.

In its general form the shell is orbicular, sublenticular, the spire being convex, but obtuse and forming one side of

## ANOSTOMA.

the lens, while the lower part of the last volution, which is also convex, forms the other side. The aperture (inaccurately described by Lamarck as "rounded") is rather semicircular and strongly toothed on both sides. The peritreme is thickened, its outer edge turned back, and its inner edge spread over a part of the spire, for the great singularity of this Genus is, that its *last volution is turned upwards, so that the aperture appears upon the same plane as the spire.*

Only two species of this Genus are known; they are land shells, and we are informed that they are brought from the East Indies, they are both very rare and much esteemed on account of their extraordinary conformation. The *Anostoma depressa* of Lamarck, which we call *A. ringens*, because we know no reason for changing an established specific name, and it is the *Helix ringens* of Linné, is much larger than his *A. globulosa*; its spire is also considerably flatter, it has from three to five compressed teeth in its outer lip, and when there are five, the two upper ones are the smallest; two teeth are placed upon the inner lip, of which the upper one is much the larger; this species measures about an inch and an half in its greatest diameter. The *Anostoma globulosum* has four teeth in its outer lip and two on its inner; it has also a peculiarity, by which it may readily be known, that is, a small hole pierced in the upper end of the thickened peritreme, which becomes filled up by age and is then only an impressed spot. In both species, a spiral brown line colours the upper edge of the volutions: they are both of a pale brownish colour, with spots and lines of a darker brown.

Fig. 1. Two views of *Anostoma ringens*, the upper one shewing the spire and the aperture; the lower view shewing the convex under side, and the last half of the last volution extending from the center to the edge, to carry the aperture to the side of the spire.

2. Two views of *Anostoma globulosum*.

## CRENATULA.

—◆◆—  
*Lam.*—Ann. du Mus. vol. 3, p. 25.  
 —◆◆—

**TESTA** subæquivalvis, complanata, lamellosa, subirregularis. *Cardo* lateralis, linearis, marginalis, internè crenulatus, crenis in seriem ordinatis, callosis, subexcavatis, ligamentum excipientibus.

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Not a single shell of this Genus do we find represented until Lamarck instituted it in the third volume of the Annales du Museum, if we except a bad figure in Chemnitz, v. 7, t. 58, f. 175. Lamarck's account of the Genus is accompanied by representations of two species, and in his Hist. Nat. des Anim. sans vert. he has described several more, nevertheless, on account as we suppose of the irregularity of the shell, we have experienced considerable difficulty in deciding to which species those engraved in our plate belong, nor dare we now mention them as positively decided; indeed, we think there is need of much caution in determining the species of Genera, subject as this is to much variation in form. We have been led to the determination which we have adopted, by the difference in the form of the inner pearly portion of the shell, which does not seem to be subject to the same degree of variation with the outer foliaceous portion. In the form of this part, the small shell, fig. 2, agrees with Lamarck's *C. mytiloides*, and the two larger with his *C. avicularis*.

The *Crenatula*, figured by Chemnitz, is arranged with *Ostrea* by Gmelin, from which, however, it is easily distinguished by its crenulated linear hinge; it is much more nearly allied to Lamarck's *Perna*, and we formerly ventured to hint the possibility of their identity, but we now think it is distinct, for *Perna* is strongly characterized by a sinus for the passage of the byssus, which *Crenatula* has not.

## CRENATULA.

It may be known from *Arca* by its irregularity, its partly internal ligament placed between the crenulations of the hinge, and by its foliaceous texture. We do not know any other Genera with which the *Crenatulæ* can be confounded: its near resemblance to *Perna* will render it necessary as we proceed to mention every particular difference between the two Genera, which we shall do in describing *Crenatula*; and this appears to us the more necessary, as Bowdich's representation of a shell of this Genus is not calculated to give even a tolerable idea of the subject intended; and as Parkinson seems to have mistaken a small species of *Perna* for one of this Genus, evidenced by his shewing distinctly the sinus for the passage of the byssus.

The *Crenatulæ* are nearly equivalve, flat, lamellose, rather irregular, and similar in these characters to *Perna*, though rather more gibbous. The hinge of *Crenatula* is lateral (because the shell itself is obliquely elongated, which *Perna* is not,) linear, marginal, crenulated on the inside, the crenulæ arranged in a row along the hinge, each of them forming a little rounded callosity and hollowed out to receive a portion of the ligament. In several of these characters it differs from *Perna*, whose hinge is, indeed, marginal and linear; but instead of teeth or crenulations, it is divided by more or less numerous transverse, parallel grooves, (called *dents sulcifformes*, by Lamarck,) which receive the principal portion of the ligament; for the ligament in both seems to be divided into two principal portions, one of which is situated in the grooves in *Perna* and in the crenulations in *Crenatula*, and the other being the smaller, is attached to the raised interstices in both. The *Crenatulæ* are in general, we believe always, fragile and slender shells, whereas the *Pernæ* are much stronger and of thicker substance; this difference might be supposed to arise from age, but it is constantly the case even in young specimens of *Pernæ*. The pearly portion of the inside of these shells differs also very materially, for in *Perna* it is larger and more extended than in *Crenatula*, taking up the greater part of the inside and remaining of the same shape as the shell, while in *Crenatula* it does not take up quite half of the inside of the shell, it extends along the hinge margin, and forms nearly a straight line from the umbo to the most distant point of the shell, in an oblique direction, In *Crenatula* the mus-

## CRENATULA.

cular impression is very indistinct, it is, however, of an oblong form and placed near the anterior edge of the pearly part of the shell. By far the greater part of the shell of the *Crenatulæ* is of the same leafy substance, composed of perpendicular fibres, as the outside of *Ostrea*, *Perna*, *Malleus*, &c. We cannot tell whether or not *Crenatula* has a byssus, we understand it is found imbedded in sponges. Lamarck describes several recent species in his "*Animaux sans vertebres*," which are all marine; he says, they are rare, as yet but little known, and that they are brought from the seas of warm climates: two of our specimens are from the South Seas. We do not know of any fossil species; for both the fossils which Parkinson has figured as probably belonging to *Crenatula*, possess the characteristic mark of *Perna*.

On account of the near resemblance of *Crenatula* to *Inoceramus*, we may be expected here to explain the differences between the two genera, but as the original account of *Inoceramus* will shortly appear in the Trans. of Linn. Soc. we must decline it for the present, intending to take the earliest opportunity of presenting our readers with as complete an account as possible of that Genus.

Fig. 1, 3. *Crenatula avicularis*.  
2. ——— *mytiloides*.

1. The first part of the paper  
describes the general situation  
of the country and the  
population. It also mentions  
the main cities and the  
principal occupations of the  
people. The second part of the  
paper describes the climate and  
the natural resources of the  
country. It also mentions the  
main rivers and the principal  
ports of the country.

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main rivers and the principal  
ports of the country.

## PERNA.



TESTA subæquivalvis, complanata, lamellosa, subirregularis. *Cardo* linearis, marginalis, sulcis plurimis, transversis, parallelis, oppositis, *ligamentum* multipartitum inter se excipientibus. *Sinus* byssi posticus, subhians, infra cardinis extremitatem, parietibus incrassatis.



As we have already stated the illustrious Linné has arranged the shells of this Genus among his *Ostreæ*, instead of distinguishing them as a particular Genus, as he might have done, in the opinion of Lamarck, not only on account of the peculiarities of the hinge, but also on account of the mode by which they attach themselves to the submarine rocks. In these particulars, *Perna* is unquestionably very distinct from *Ostreæ*; but on account of their general external similarity we are not astonished at Linné's associating them together, particularly when we consider that he had not the means of descending to *minutiæ*; we are rather surprized, that, with the very small means he possessed, he should have laid so good a foundation, and that succeeding Conchologists with their extended opportunities, have only added to and embellished the superstructure. Lamarck has, however, described perfectly well the characters essential to the *Perna*, not only to distinguish them from the *Ostreæ*, but also from the *Crenatulæ* and the *Inocerami*, as well as from the *Arcacæ*, which, on account of their numerous teeth, might have been confounded with them: these latter are, however, regular shells, and the teeth of one valve are alternately received between those of the other valve; while in the *Pernæ*, the teeth (if the interstices between the sulci may be so called) lie one against another when the valves are closed: the *ligament* also lies *between* the teeth in *Perna*, but in the *Arcacæ* is completely external. There is one expression which Lamarck has made use of in his definition of *Perna*, which, however, he has virtually corrected in his observa-



## PERNA.

tions; it is "*dents sulciformes*:" for, in fact, if the word "*teeth*" is at all applicable in this Genus, it must be applied to the interstices between the grooves, and not to the grooves themselves.

These shells are nearly equivalve, flat, and rather irregular, thickish, externally lamellar, the laminæ composed of minute perpendicular fibres; their umbones are small, nearly equal and placed at the posterior extremity of the hinge margin. Hinge linear, marginal, with numerous (sometimes not more than three or four) transverse, parallel, opposite grooves, which, as well as the flattened ridges between, receive the ligament. A posterior sinus for the passage of the byssus, by which it is attached to submarine rocks, &c. placed immediately beneath the extremity of the hinge margin, with parietal callosity, and more distinct in the right hand valve than in the other. The inner pearly part of the shells extends itself nearly in the same shape as the outer fibrous portion, but not quite so far. There is one distinct, rather irregular, oblique muscular impression, and a row of small dots which serve as points of attachment for a part of the mantle, placed at the posterior side near the sinus for the passage of the byssus. The anterior extremity of the hinge is narrower than the posterior part, and is frequently produced into the form of a pointed lobe, but this is by no means to be considered a character of the Genus, any more than the similar, sometimes very acute lobes in *Malleus* are, because it is not essential, and several species have it not.

We have mentioned under *Crenatula*, the characters by which *Pernæ* may be distinguished from it, therefore shall not here repeat them.

The *Pernæ* are marine, the recent species are brought from the Indian Seas and from New Holland. Several fossil species are known which occur in London Clay, Calcaire grossière, Clunch Clay, &c.

Fig. 1. *Perna Isognomon*.

2. ——— Ehippium.

3. ——— Francii.

4. ——— to which, being only the cast of the inside, we do not give a specific name.

5. ——— maxillata.

## SPONDYLUS.



**TESTA** inæqualvis, subirregularis, auriculata, echinata aut rigida, adhærens; umbonibus inæqualibus, valvæ inferioris areâ cardinali externâ separatis. Area plana, trigona, ætate productior, ligamenti sulco, interdum oblecto, partita. *Cardo valvæ inferioris*, dentibus duobus validis, reflexis, cum foveâ ligamenti intermediâ, sulco areæ conterminâ, cavitatibusque duâbus lateralibus dentes valvæ alterius recipientibus; *valvæ superioris*, dentibus duobus validis, reflexis, lateralibus, cum cavitatibus intermediis duâbus dentes valvæ inferioris itidem recipientibus et foveâ ligamenti centrali. *Ligamentum internum* fossulæ cardinis centrali insertum, turgidum, *externum* tenue, margini lineari cardinis, in utrâque valvâ, affixum. *Impressio muscularis* unica, suborbicularis, sublateralis.



A GENUS of shells, remarkable, not only for the brilliancy of colouring of most of its species and for the singularity of its external forms, but also for the clearness and precision of the characters by which it is distinguished from all other genera: indeed only one Lamarckian Genus has ever been arranged with it, the *Plicatula*, and that, which resembles it nearly in the characters of its hinge teeth, is, nevertheless, most easily known from it, by its not having the remarkable, external, triangular area of *Spondylus*. The *Spondyli*, though commonly called in France, "*Huitres épineuses*," are not related to the *Ostrea*, excepting in the unequal size of their two valves and the manner of their adherence, which is always by the outer part of the larger valve. They are in general rather irregular; their form, as they increase by age, being modified, like that of most other similarly attached shells, by the rock or coral,

## SPONDYLUS.

or other subject to which they adhere, but this does not prevent them from constantly having two small ears, one on each side of the umbo, and a straight hinge line as in *Pecten*. The Spondyli are always rough on the outside, generally covered with spines and foliations of very varied shapes; sometimes the spines are subulate, sometimes liguliform, some are sharp pointed, some are curved in various directions and spatulate or foliated at their points, generally more regular and more like spines, and always arranged in rows upon radiating striæ or ribs on the upper valve and such parts of the lower valve as are most free, but in those parts of the lower valve, by which they become attached, uniting by their sides and spreading across many ribs; sometimes all round the shell and producing a sort of foliations or furbelows of very varied extent and shape: very seldom does it happen that a Spondylus adheres only by so small a space at the umbo as to leave the whole of the lower valve free, but in such a case both valves are covered with rows of spines. It is also remarkable, that the upper valve and the spines particularly, are generally more highly coloured than the lower valve or its spines and foliations, in this respect there is sometimes a great contrast between the two valves, the upper one being very darkly and beautifully coloured, and the lower one scarcely coloured at all. The umbones are unequal and distant, being separated from each other by a triangular flat area between the umbo and the hinge of the lower valve, which has the appearance of having been sliced off by a sharp instrument, and is divided by a longitudinal groove, in which lie the decaying remains of that portion of the ligament which is no longer useful: this groove is, however, frequently covered over with shelly matter so as to be no longer visible; the area itself increases in length by age. *Hinge of the lower valve* with two very strong teeth bent backwards; a central hollow which is a continuation of the groove in the area and to which the ligament is fixed, and two lateral cavities for receiving the teeth of the upper valve. *Hinge of the upper valve* with two strong, also reflected, lateral teeth; two intermediate cavities for receiving the teeth of the lower valve and a central hollow for the ligament. The teeth of the two valves are so formed, that without breaking away some portions of them or of the circumjacent parts of the hinge, the two valves cannot be separated; we have mentioned this fact before, in our

## SPONDYLUS.

account of the Genus *Ostrea*, and we here repeat it, to show how impossible it is that the animal should displace its upper valve, as Lamarck asserts, in order to produce the progressive elongation of the area of the hinge of the lower valve. The ligament in the present Genus is double; the principal portion being internal, turgid and fixed in the central pits of the two hinges: the other portion is external, slender, and attaches the valves to each other along the linear margin of each valve: this seems hitherto to have escaped the notice of conchological writers, but it is, nevertheless, distinct in this genus, as well as in *Pecten*, the genus to which *Spondylus* approaches nearest in natural affinity. A single, suborbicular, rather lateral muscular impression is observable, and the impression of the muscle of attachment of the mantle is continuous, surrounding the former.

Because of the varied forms which the spines and foliations of the outside take, it is extremely difficult to distinguish and describe the species in this fine Genus; Lamarck has published the specific characters of twenty-one recent species; we venture to think, however, that several of these ought to be regarded only as variations: one of the most distinct and beautiful of them is the *Sp. regius*, remarkable among its congeners for the regularity of its form, the length of its spines and the smallness of the cardinal area: next to that we think the *Sp. aurantius* a remarkably beautiful shell: the *Sp. ducalis* is worthy of particular notice for the richness and variety of its colours: they are all extremely ornamental and consequently much valued by collectors. Besides the recent, Lamarck describes four fossil species, all of which appear to belong to the more recent formations: we have represented one which we believe to be Lamarck's *Sp. podopsideus*.

- Fig. 1. *Spondylus aurantius*, inside of the upper valve, to shew the hinge.  
 2. —————, inside of the lower valve to show the hinge and the cardinal area when the ligamental groove is closed.  
 3. Hinge of the lower valve of *Sp. Gædaropus* to show the cardinal area with its ligamental groove open.  
 4. *Sp. ducalis*.  
 5. *Sp. podopsideus*.



## VULSELLA.



TESTA longitudinalis, equivalvis, subirregularis, umbonibus æqualibus. Callum cardinale, in utrâque valvâ, prominulum, supernè depressum, et foveâ ligamenti conicâ, obliquè arcuatâ, de-super impressum. Impressio muscularis unica, oblonga, versus basim testæ attenuata.



THE *Vulsellæ*, separated from the *Ostreæ* by Lamarck, appear, nevertheless, to be nearly related to them: the differences, however, are such, that they cannot be re-united to them; and, indeed, they seem sufficiently distinct, not only from *Ostrea*, but from every other Genus, and not to be confounded with any, when a due degree of attention is paid to the characters peculiar to each. Without further preface we shall describe *Vulsella*, and as we proceed, we will endeavour to point out the particular characters which distinguish it from other genera, such as *Ostrea*, *Crenatula* and others, which appear most nearly related to it.

Shell longitudinal, that is longer, in the direction from the base to the summit (using these terms in their common conchological acceptation) than it is broad: the general form is rather irregular, but the two valves are equal and alike, in these respects, differing materially from *Ostrea*, which is inequivalve; and agreeing with *Crenatula*: the *umbones* or *beaks* are also equal, but a little separated: between them lie the decayed remains of so much of the ligament as is no longer useful. The two valves are united at the hinge, as in *Ostrea*, by a semi-internal ligament, attached in each valve to a sub-triangular disk or facet, one of the points of its triangle being close to the umbo and rather inclined to one side; this disk, as in *Ostrea*, is tripartite, being divided by two lines which divaricate from the umbo; the central portion, however, in *Vulsella* is hollow and forms a cal-

## VULSELLA.

losity projecting within the shell, and to this conical hollow the principal portion of the ligament is attached. A single muscular impression only is observable in each valve; this is lateral, oblong and attenuated towards the base of the shell. *Vulsella* differs from *Crenatula* principally in the hinge, which has only one projecting callosity, whereas that of *Crenatula* has many: it further differs from *Ostrea* in not being attached, but is said to be generally, we believe it is always, found imbedded in sponges, to which it is probably fixed by numerous rows of minute asperities on its outer surface, in the same manner as *Acasta*, among the Cirripedes, is by the small hooked spines of its six valves. Having in our possession several specimens of *Vulsellæ* in their native situation, we think we may safely affirm that it is not attached by any byssus; though, as Lamarck well observes, they are sometimes a little gaping posteriorly. The shell, as in all cognate genera, is composed of two substances, one internal and pearly, the other external and consisting of laminæ formed of perpendicular fibres. On account of the irregularity of the shells of this genus, we think it must be extremely difficult to distinguish the species, and, consequently, we believe that several mere varieties are raised to the rank of species. Lamarck describes six, which are *recent*, differing from each other in *size, colouring and form*; all characters of minor importance, particularly in irregular shells. He also mentions one *fossil* species, found at *Grignon*.

We have given representations.

Fig. 1. & 2. Of the *inside and outside* of a specimen of *Vulsella lingulata*, of *Lam.*—*Mya*\* *Vulsella*, Linn. commonly called the *Hounds-ear Oyster*, from the Indian Ocean; a shell much esteemed in this country, on account of its rarity.

3. A single specimen in a sponge; and

4. A group of small ones, which we believe to be a variety, and the younger state of the same species.

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\* We have not pointed out the differences between this Genus and *Mya*, because it is not in the slightest degree related to it.



## COLUMBELLA.

—◆◆—

*Lam.*—Système des Anim. sans vert.

—◆◆—

**TESTA** ovato-oblonga, epidermide induta; *spirâ* breviusculâ; *aperturâ* elongatâ, basi emarginatâ; *labio externo* incrassato, medianâ parte intus tumido, vel subtumido, denticulato; *interno* plerumque basi denticulato. (*Operculum minutissimum, corneum, exile.*)

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**THE** *Voluta mercatoria* of *Linné*, may be regarded as the type of this pretty little Genus, of which only a few species are known; De Blainville, in the Dictionnaire des Sciences Naturelles, (article *Colombelle*,) says only *two*; but we believe the number is extended to at least ten times as many.

The general form of the shells of this genus is ovate-oblong, some species are rather elongated, and others are almost as broad as they are long, in proportion as the spire, which is in general short, is either elongated or depressed. The aperture is in most of the species more than half the length of the shell, rather narrow and notched at the base, scarcely produced into a very short canal. The outer lip is thickened, the middle part of it is internally more or less tumid; and the tumid part denticulated more or less strongly: sometimes, instead of the tumour, there are only a few strong teeth. The central part of the inner lip, opposite to the internal tumour of the outer, is generally rather contracted, so that the internal edges of the aperture are nearly parallel, and it appears rather sinuous: the columella is mostly denticulate at the base. Lamarck and Bruguière inform us, that the animal inhabitant of this shell is furnished with a very small, slender, horny operculum, probably on the authority of Adanson: we have never



## COLUMBELLA.

seen this, and therefore we mention it in our Latin generic character, as a character not given on our own personal responsibility, though we are disposed to believe it to be the case, and that this genus is therefore related to *Ricinula*. Bruguière has placed some of the species among the *Mitræ*, in plates 374 and 375 of the *Encycl. Methodique*, and under the article *Buccinum* in the text, he describes several others.

The following are the specific characters of such species of this Genus represented in our plate, as we do not find hitherto named: we have figured the extremes to which it seems to go in respect of its most important characters; those to which we do not add a Latin phrase are named in former works. A singular variety of *C. mercatoria*, is added to our plate, fig. 9. The *Columbellæ* are marine; no fossil species are known.

Fig. 1. *Columbella strombiformis*; plates of the *Dictionnaire des Sciences naturelles*.

2. *C. labiosa*; testæ spirâ brevi, labio externo lato, supernè in humerum excrescente.

From California.

3. *C. rustica*; Vol. rustica, auctorum.
4. *C. mendicaria*; Vol. mendicaria, auctorum.
5. *C. punctata*; *Buccinum punctatum*, Brug. p. 281.
6. *C. Terpsichore*; *Buccinum Terpsichore*, Leathes M.S.
7. *C. nitidula*; *Buccinum nitidulum*, auctorum.
8. *C. concinna*; testâ oblongâ, aperturæ longitudine spiram æquante; medianâ labii externi parte intus denticulatâ, vel parte tumidâ obsoletiusculâ.  
A pretty little shell, confounded by Adanson; and, we believe, by all former writers with *Buccinum nitidulum*, of which they have regarded it as a variety. The one we have represented under the name of *Columbella nitidula*, is the more like of the two to Adanson's *Bigni*, and which differs from this in having the aperture proportionably longer and the internal tumour of the outer lip more distinct.
9. *C. mercatoriæ*, var. spirâ productâ,

## AMPHIDESMA.

Lam.—Hist. Nat. des Anim. sans vert. v. p. 489.

**TESTA** subinæquilatera, transversa, subovalis vel rotundata: (*interdum lateribus subhians:*) *Cardo* utriusque valvæ dente unico, vel dentibus duobus; dentibus lateralibus valvæ alterius, contiguïs, distinctis; alterius obsoletis. *Ligamentum* duplex, *externum* tenue, breve; *internum* foveolis cardinalibus elongatis, affixum. *Impressiones musculares* duæ, distantes, suborbiculares. *Sinus impressionis pallii* adhærentis muscoli magnus.

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ESTABLISHED by Lamarck, as he informs us, at first under the name of *Donacilla*, because the species with which he was first acquainted, had the aspect of a *Donax*. The name, *Amphidesma*, which he has since given to it, is taken from its great peculiarity, which consists in its having one portion of the Ligament external, and the other, generally far the greater, entirely within the shell; for the ligament in this genus, as well as in all regular bivalves, consists of two distinct portions; the great difference between this and other bivalves being in the position of the inner portion at a distance from the outer; and in this respect it approaches near to the *Macracées*, and the genus *Lutraria* particularly, from which indeed it is only distinguished by its lateral teeth, and by the valves being close all around, whereas in *Lutraria* they gape at one end. These appear to us to be the principal distinctions between *Amphidesma* and *Lutraria*, we are consequently of opinion that *Amphidesma* should be arranged near to or with the *Macracées*, and indeed we find several of Lamarck's species arranged by Linneans with the *Macræ*. We know not what considerations have induced Montagu to add several of them to his genus *Ligula*, of which they do not possess the

## AMPHIDESMA.

essential character; nor why Leach has united three species, namely, the *A. Boysii*, *tenu*e and *prismaticum*, together with Lamarck's *Lutraria Listeri* under the generic name of *Abra*: all those three species appear to us to possess the characters peculiar to *Amphidesma*, we think therefore that Lamarck has rightly placed them in that Genus. The *Tellina flexuosa* of Maton and Rackett, *Thyatira flexuosa*, Leach, should not however remain in *Amphidesma*, for it has not the internal ligament.

We believe the shells of that Genus are always transverse; they are inequilateral, sometimes very slightly so, and in general form they are either nearly orbicular or oval. (According to Lamarck the sides are sometimes gaping.) Sometimes there is one, sometimes there are two, small slender teeth in the hinge of each valve; two distinct lateral elongated teeth, placed rather near the hinge in one valve, which, however, are scarcely to be perceived in the other. The ligament, as we have before remarked is double, its external portion is slender, rather short, and the internal, which is in general longer and larger, is attached in each valve to a more or less elongated groove, which begins immediately within the umbo, and is continued within the anterior lateral tooth. There is a very large sinus in the muscular impression of the mantle, and in the large species, a distinct flexuosity in the anterior margin of both valves, as in *Tellina*.

We have given two representations of *Amphidesma variegatum*, Lamarck, from the coast of Brazil, and two views of another species from the same coast, not mentioned by Lamarck; it is the *Tellina reticulata*, Linné, published as English by Montagu, under the name of *Tellina proficua*; we have called it *Amphidesma reticulatum*, because we think it right to retain its old specific name; the *Amph. lacteum*, *Boysii*, *prismaticum*, and *tenu*e, all of which are English species, have been already figured, so that we do not think it necessary to add any representation of them. We do not venture to add the *Mactra Listeri* to this Genus, through Lamarck, who has arranged it with his *Lutrariæ*, seems to have overlooked the external ligament, so conspicuous in that shell.

The species of this marine Genus do not appear to be very numerous; we do not recollect to have seen any in a fossil state.

## SUCCINEA.

—◆◆◆—  
*Draparnaud.*  
—◆◆◆—

**TESTA** ovata vel ovato-conica, aperturâ amplâ, integrâ, longitudinali; labio externo acuto, non reflexo. Columellâ lævis, angustâ, attenuato-acutâ, in peritrema tandem exeunte.

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ARRANGED among the *Helices* by all authors, until Bruguière separated it from them, still to associate it with shells of various families in his *Bulimus*. Draparnaud seems to have been the first who saw the propriety of distinguishing as a Genus these apparently amphibious animals; he named the European species *Succinea*. Lamarck soon after, and without knowing what Draparnaud had done, but struck with the singularity of the *Bulimus patulus* of Bruguière, from Guadeloupe, and thinking it worthy of a more distinguished place, united it to the European species and formed the Genus *Amphibulima*, which he has, however, given up and adopted the prior appellation of Draparnaud. This is evidently a latinization of the French name for the most common species "Ambrée," or "Ambrette;" and inasmuch as it is taken from its colour, it is a bad generic name, but we choose rather to adopt it than to create confusion by giving it a new name.

The *Succinea* approaches in general form more nearly to *Limnea* than to any other Genus; from that, however, the shell may be known by its wanting the oblique fold on the columella, and the animal by its having two pair of tentacula, and its eyes being placed at the summits of the larger pair. The *Succinea*, moreover, though it lives near the water, and in situations where it is sometimes covered with it, does not live habitually in it, but breathes only air; it is therefore, strictly speaking, a land shell. From *Bulimus* it may be distinguished by the sharp edge of its outer lip.

## SUCCINEA.

Shell ovate, or ovately conical, in general rather elongated, with a very large, entire, longitudinal aperture, in general about two thirds the length of the shell. Edge of the outer lip sharp, not thickened nor reflected, uniting itself at its lower part to the smooth, sharp-edged, narrow, attenuated columella. Inner lip spread over a small part of the lower and inner side of the last volution.

Lamarck describes three recent species of this Genus, and we are not disposed to question the propriety of uniting them together in one Genus, though later authors appear to wish to separate the *Bulimus patulus* of Bruguière, adopting the generic appellation of *Amphibulima* for it. De Ferussac, who notices nine species, unites them under the appellation of *Helix Cochlohydra*, not thinking it sufficiently different from *Helix* to be separated from it as a distinct Genus. We have represented three species.

Fig.1. *Succinea cucullata*, Lam. Hist. Nat. des Anim. sans vert. vi. part ii. p. 134. *Helix Cochlohydra patula*, De Ferussac Hist. des Mollusques, t. xi. f. 14 to 16. Of this we have given three views, in order to show the shortness of the spire, and the magnitude and obliquity of the aperture; which is, indeed, its peculiar character, and upon which some writers would also found the characters of a distinct genus.

2. Two views of a new species which we have lately received from Brazil, and which we propose to designate by the name of *S. ovata*. We at first hesitated upon the propriety of admitting it into this genus; but as we find, upon examination, all the characters of *Succinea*, its claim to a place here can be no longer questioned. We add a specific character, because we do not find the species mentioned any where. *Succinea ovata*; testâ ovatâ, corneâ, longitudinaliter striatâ, spirâ brevissimâ; anfractibus tribus, convexiusculis; aperturâ ovatâ, obliquâ.

Length to the breadth, as 2 to 3.

3. Two views of *S. amphibia*, Drap. *Bulimus succineus*, Brug. *Helix putris*, Linn. &c. a common English species.

A few other recent species are known, of which the *S. oblonga* is found in several parts of Europe, and some others are inhabitants of warm climates. We have never seen nor heard of any fossil species of this Genus.

## UNGULINA.



*Daudin.*



**TESTA** suborbicularis, supernè rotundata, æquivalvis, subæquilatera; valvis non hiantibus. *Dens cardinalis*, in utrâque valvâ, brevis, subdivisus: dente minutissimo in alterâ adjecto. Fovea ligamenti oblonga, marginalis, medio angustato-divisa. *Ligamentum* semi-internum, foveis insertum. *Impressiones musculares* duæ, oblongæ. *Impressio musculi* adhærentis pallii integra.



A Genus of bivalve shells, established by Daudin, and adopted by Lamarck, but at present almost unknown in this country. Lamarck does not appear to have known the locality of the two doubtful species which he has described, but our specimens are brought from Senegal: we have good reason to think they are marine. In general form and appearance these shells very nearly resemble the *Lucinæ*; an examination of the muscular impressions will easily distinguish them, for in *Lucina* the posterior muscular impression is always of a more or less elongated ligulate form: *Lucina* has, moreover, in general, two lateral teeth, which *Ungulina* has not. Sometimes the specimens of this latter Genus become elongated by age; but when young they are all nearly orbicular, and even when of a more advanced age we think this circumstance cannot be regarded as a good specific distinction, because it appears, in the specimens we have seen, to have been caused by some accident, with the nature of which we are not acquainted. We therefore, in describing the general form of this shell, rather approve of the term suborbicular, than of longitudinal; its valves are equal, nearly equi-

## UNGULINA.

lateral, rather deep, so that, when closed, they have a very regular, but thickly lenticular form. In the hinge of each valve there is a single, short, bifid tooth, and besides this a very small tooth in one valve; but there are no lateral teeth. The pit of the ligament is oblong, placed just within the anterior cardinal margin, contracted and as it were divided into two portions near the center, of which, that nearest the umbo receives the inner part of the ligament, and the more distant part, the outer. The ligament is in a great measure internal, but a small portion is seen from the outside, on account of the nearly marginal situation of the pit. There are two oblong, muscular impressions, and the impression of the muscle by which the mantle is attached to the shell is entire. The Ungulinæ which we have seen are concentrically grooved on the outside, and they have a brown horny epidermis, generally worn off near the umbones, which are not eroded. We think with Lamarck, that the two species he has mentioned may be only accidental varieties of the same; if they are distinct, the one we have represented is *U. transversa*.

We are obliged to our kind friend, the Provost of Eton, for the loan of the specimen from which our figure is taken: we possess a specimen in a younger state, which has, however, precisely the same form.

The figure given by Bosc Hist. Nat. des Coq. is *U. oblonga*, Lam.; in consequence of its elongated form, the muscular impressions are considerably lengthened, and the whole shell has much of the appearance of the human nail.



## DONAX.



TESTA transversa, æquivalvis, inæquilaterá; latere antico plerumque brevi, obtuso. *Dentes cardinales alterius valvæ*, duo, alterius unicus superne bifidus; *laterales*, duo vel unus, plùs minùsve remoti. *Ligamentum* externum, breve, plerumque bipartitum, portiuncula post umbones posita. *Sinus impressionis pallii* adhærentis musculi, magnus.



IF we except two or three species which Lamarck has separated from it to form his present *Capsa*, and one or two evidently not related to it, the Linnean Genus *Donax*, has been subjected to fewer curtailments than almost any other: it is nevertheless difficult, on account of the *various characters of the hinges* of the species included, to assign to it any definite set of characters, by which it may at once be distinguished from all others; the shortness of the anterior side,\* so generally conspicuous, and the rather cuneiform general shape, appear to us to be the most prominent external characters of the species constituting this Genus, although there are not wanting instances in which the sides of the shells are nearly equal, and others in which their general form does not very nearly approximate to that of a wedge.

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\* Lamarck is at issue with himself, when he calls the ligament posterior in *Donax*: for the sake of consistency, we must continue to call the side on which the ligament is placed, as well as the sinus in the muscular impression of the mantle, whether it be the shorter or the longer, the anterior side. We are aware that Cuvier has pointed out the impropriety of this; but the term anterior is generally adopted for the side which bears the ligament, and posterior for the opposite side.



## DONAX.

The Donaces are transverse shells, whose two valves are exactly alike; but they are inequilateral, the anterior side, contrary to general custom, being for the most part the shorter, though in a few species the sides are also nearly equal in length. In one valve there are two, more or less distinct cardinal teeth, and in the other only one, (for we do not consider the nymphæ to which the ligament is attached as connected with the teeth,) but this one is most commonly divided or notched at its superior extremity.\* The lateral teeth are more variable; in some species, as in *D. Scortum*, there are not only two distinct lateral teeth, one on each side of the cardinal teeth, and placed near to them; but in one valve there is also a linear posterior process, placed at a distance from the other lateral teeth, and between which and the edge of the shell there is a groove that receives the edge of the other valve; in other species only the anterior lateral tooth can be distinguished in each valve, and the above mentioned linear process: in other species again, we may observe two distinct lateral teeth in one valve, the posterior being more distant than the anterior, and only the traces of them in the other valve; and in some the lateral teeth are scarcely distinguishable at all. The ligament is external, generally short, sometimes remarkably so; the principal part of it is anterior, that is affixed to the shorter side of the shell, but in most of the Donaces a small portion of the ligament is also placed behind the umbones. A large sinus is seen in the impression of the muscle of attachment of the mantle.

The Donaces are marine, they are most commonly covered with a thin, horny, light coloured epidermis, very few of them are remarkable for the brilliancy or variety of their colours, though some of them are very pretty little shells. The recent species are numerous, and several of them are found on our coasts, of these the *D. denticulata*† is the most remarkable: that named *D. Trunculus* by English writers is said to be a distinct species by Lamarck,

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\* We know that the *Donax Meroe* as well as the *D. scripta* have two distinct teeth; but we are not convinced of the propriety of uniting them in the same Genus with the other Donaces.

† The fact of this being a native of our coast wants confirmation.

## DONAX.

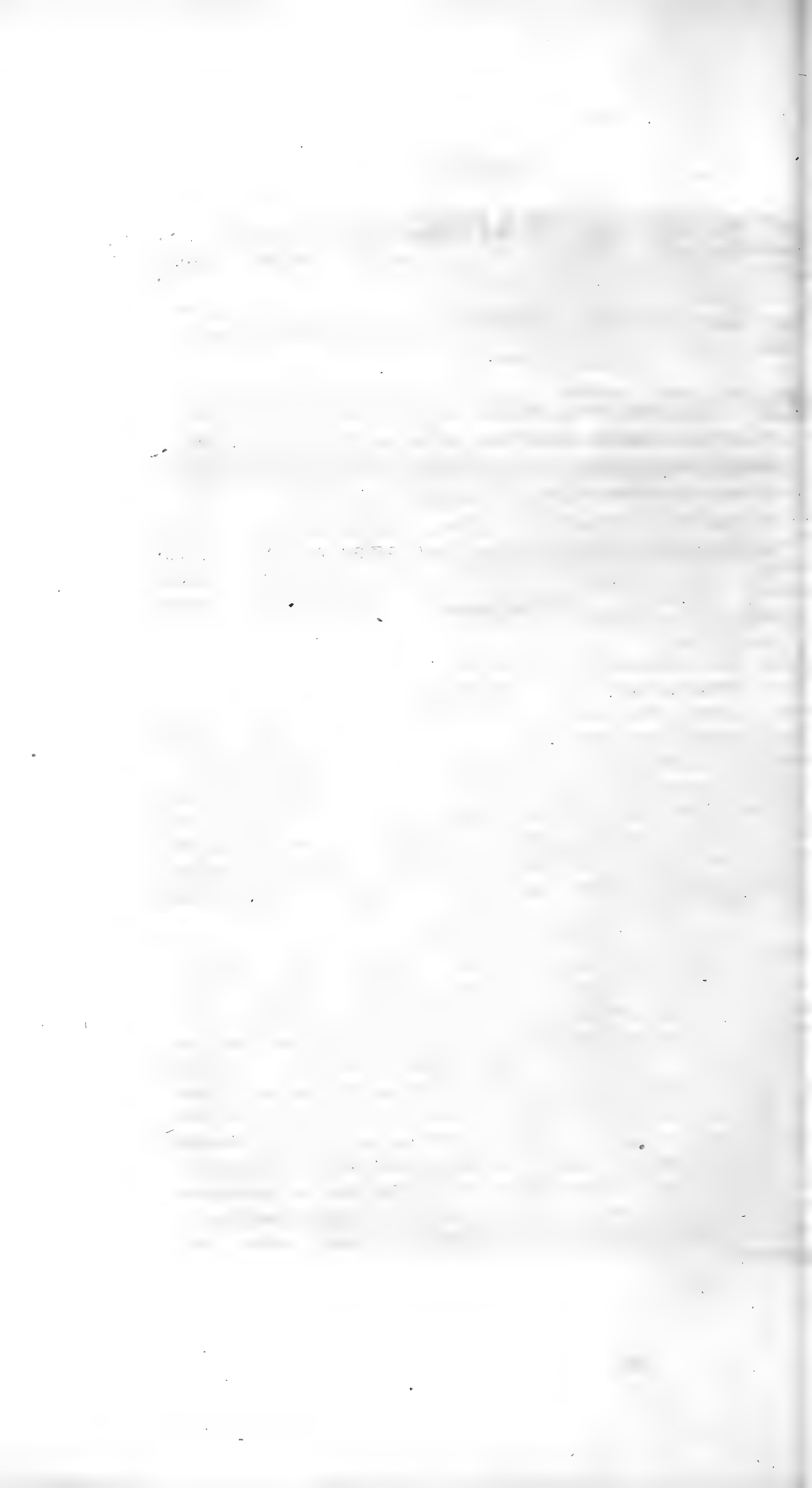
and the shell named *Donax complanata* belongs to Lamarck's Capsa, while we believe the *D. plebeia* of authors to be a species of *Erycina*.

Of fossil species there are very few; Brocchi mentions two, and we possess a small one from Bordeaux, but we believe they are very scarce.

Our plate contains representations of four species :

- Fig. 1. *Donax Scortum*.  
 2. ——— *cuneata*.  
 3. *Donax Trunculus*, Linn. This is the English shell, and agrees perfectly well with the Linnean description, wherefore we retain the name of *Trunculus* for it.  
 4. ——— *deltoides*.

Lamarck divides *Donax* into two sections; those whose edges are entire without crenulation, and those whose edges are crenulated: all the species we have examined are more or less distinctly crenulated.



## CAPSA.

Lam. Hist. Nat. des Anim. sans vert. V. p. 553.

TESTA transversa, æquivalvis, subinæquilatera, clausa; Cardo dentibus duobus in valvâ alterâ, dente cardinali unico, bifido, et dentibus laterilibus duobus, obsoletissimis in alterâ. Ligamentum externum. Sinus impressionis pallii adhærentis musculi magnus, oblongus.

LAMARCK appears to have first instituted the Genus *Capsa*, in his *Système*, giving as the type of it, the *Venus deflorata*, Linn. Bruguière, in the *Encyclopédie Methodique*, De Blainville, in the *Dictionnaire des Sciences Naturelles*, and other authors have adopted the Genus, and it consequently appeared to be established; but, in his *Hist. Nat.* Lamarck, without explaining his reasons for so doing, has left in it only two (probably varieties of one) species which he has taken from the Linnean *Donax*; leaving *Venus deflorata*, Linn. and all its cognate species to the formerly established Genus *Sanguinolaria*.

Of the two species which now remain in *Capsa*, the first is the *C. lævigata*, *Donax lævigata*, Linn. and the second is figured among the *Donaces* by Bruguière, it is named *Capsa brasiliensis*; they are indeed very nearly related to *Donax*, but the characters of the hinge, and the absence of crenulation around the edge of the shells, will serve to distinguish them. The *Donax complanata*, *Mont.* is the only English *Capsa* we are acquainted with, for though we have lately been introduced to the *Veneres decussata*, *pullastra*, *virginea*, *aurea*, and their congeners, under the generic appellation of *Capsa*, we are now convinced that this must be owing to the misapprehension of the excellent Naturalist whose loss to science we sincerely deplore.

## CAPSA.

Capsa, as it now stands, is a small Genus of marine shells, which are transverse, equivalve, inequilateral and not gaping; in which particular they differ from the Sanguinolariæ, but they resemble each other very nearly in the teeth of the hinge: in one valve there are two cardinal teeth, diverging from a point close to the umbo, but no lateral teeth, and in the other valve only one distinct, bifid, cardinal tooth is to be seen, with two distant very obsolete lateral teeth. The ligament is external, entirely placed on the anterior side of the umbones. There is a large sinus in the muscular impression of the mantle.

The few species of this Genus known to us at present are smooth shells, the *C. brasiliensis*, which we have represented f. 1, is sometimes quite white, sometimes of a pale fulvous colour, but more frequently of a paler or darker violaceous hue, and covered with an olive green epidermis: the *C. complanata* is commonly of a yellowish colour, and has a lighter ray beginning at the umbo and increasing in width towards the edge of the shell; it has a thin corneous epidermis.

## TUBICINELLA.

Lam.---Ann. du Mus. vol. i.

**TESTA** cylindraceo-tubulosa, valvis sex longitudinaliter ferruminatis composita, recta, extus longitudinaliter striata, costis transversis annulatim cincta, utrinque truncata; apice pervio membranâ posticè clauso. Operculum quadri-valve, valvulis subquadratis, apicè attenuatis, rotundatis.

A Genus of *Cirripides*, established by Lamarck, and adopted by Leach, which appears to us to be well distinguished by its peculiar habits from the greater part of the sessile *Cirripedes*, but by the characters of the shell only, from *Coronula* of Lamarck, as well as from Leach's *Chelonobia*. Only one species is known at present, which, Lamarck informs us, is found upon the South Sea Whales, into whose skin and fat it penetrates, so that the aperture of its shelly tube is very little raised above the skin of the Whale.

The shell consists of six ligulate valves, joined together by their sides, so as to form a nearly straight cylindrical tube, which is smooth within, but longitudinally striated on the outside, and surrounded by an irregular number of transverse ribs or wings; altogether bearing a very near resemblance to a portion of a wind-pipe, for which reason it has been called *Lepas tracheæformis*; Leach has, however, designated it by the name of *Tubicinella Lamarckii*; and Lamarck has called it *T. balænarum*. This cylindrical tube is truncated at both ends, scarcely smaller at its lower than at its upper extremity; its apertures are orbicular; that at the lower

## TUBICINELLA.

end is closed according to Lamarck, by a membrane: this tube contains the animal; its operculum\* composed of four equal-sized, trapezoidal, obtuse, smooth and moveable valves, smaller and rounded at their superior extremities, is seen within, near the edge of the exposed orbicular aperture. Two of these valves of the operculum are posterior, and the other two valves anterior: the membrane which lines this operculum is not tubular, but closed at the back, and open at the top and in front for the passage of the arms or tentacula.

We have represented a group of Tubicinellæ in a portion of the skin of a whale, fig. 1.; a single specimen showing the outside of the tube, and the position of the operculum, fig. 2.; and the four valves of the operculum, fig. 3.

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\* We have not rejected the term, operculum, though it does not here seem to us to be correctly applied, at least its application here does not accord with its general acceptance; but it is, perhaps, better to use it, because it is generally adopted, and is moreover understood, than to create a new term which would only be adding one to the many difficulties already attendant on conchological science.



## ERYCINA.

Lam. Annales du Museum, VI. p. 413.

**TESTA** transversa, plerumque inæquilatera, æquivalvis. *Dentes*, *alterius valvæ*, duo *cardinales*, inæquales, divaricati, cum foveolâ ligamenti intermediâ; duo *laterales*, oblongi, compressi, breves, approximati; *alterius valvæ*, *cardinales* aut nulli, aut obsoleti; *laterales* duo, alter oblongus, compressus; alter brevis crassus. *Impressiones musculares* duæ, laterales. Sinus impressionis pallii adhærentis musculi parvus. *Ligamentum* internum, foveolæ cardinali in utrâque valvâ insertum.

WE believe that this Genus has been scarcely, if at all, known hitherto in England, except from the indistinct figures of several fossil species, published in the Annales du Museum, whose hinges, however, are so ill represented that they do not agree with the character which Lamarck gives of the Genus. We are glad, therefore, to introduce to our readers, three very distinct and well-marked recent species: we purchased two of them at the sale of Mr. Hay's collection of shells at Portsmouth, and we have received a few specimens of the third in a small collection of recent shells from Vienna, but we do not know their locality.

Shell transverse, equivalve, generally inequilateral; two unequal, divaricate, cardinal teeth, with an intermediate hollow to which the ligament is attached, and two oblong, compressed, short lateral teeth, placed near to the cardinal teeth, in one valve; in the other the cardinal teeth do not exist, or are very obsolete, or sometimes one of them is united to the anterior lateral tooth, which is very short, and thus increases its thickness; the other lateral tooth in this valve is oblong and compressed. Two lateral muscular impressions, and a very small anterior sinus in the impression of the muscle by which the mantle of the animal is attached to the shell. Ligament

## ERYCINA.

internal, attached in each valve to a narrow hollow space between the teeth.

Distinguished from *Mactra*, *Crassatella* and *Lutraria* by the teeth and the position of the ligament, which, although internal, is differently placed in *Erycina* with respect to the teeth; it is a thick shell, and approaches to *Crassatella*, but may be easily known from that by the sinus in the impression of the muscle by which the mantle is attached to the shell, and by the distinct compressed lateral teeth. The *Erycina* are marine; we know of but few recent species, but Lamarck has described nine fossil species in the sixth volume of the *Annales du Museum*, all of which are from the Calcaire grossière, and in M. DeFrance's collection.

As the three recent species we have represented, have never been described as *Erycinæ*, though we have reason to believe two of them have been admitted by Lamarck into other genera, we shall add the characters of each species, and some observations upon one or two of them.

1. *E. complanata*, testâ ovatâ, compressâ, subinæquilaterâ, lævi, epidermide olivaceâ indutâ, concolore. Tab. nost. f. 1.

2. *E. striata*, testâ æquilaterâ, subtrigonâ, compressâ, costis plurimis, confertis, transversis, anticè rigidis. Tab. nost. f. 2.

*Obs.*—This shell is figured in the *Encyclopédie Méthodique*, pl. 254, f. 4, to which Lamarck refers for a representation of his *Crassatella striata*; he does not, however, seem to have observed the teeth, nor are they shown in the figure; but the external appearance is so exact that we cannot doubt its identity.

3. *E. plebeia*, testâ oblonga, subcuneatâ, inæquilaterâ coloribus variis radiatâ, latere antico brevi, subtruncato. Tab. nost. f. 3.

*Obs.*—We believe this is the *Crassatella cuneata* of Lam. V. p. 483, and the *Donax plebeia* of English authors, none of whom, however, seem to have noticed the internal ligament, in which it differs so essentially from *Donax*; nor does Montagu's figure show the hinge of that shell: the specimens we have seen are very variable in colour, but they all have one or two radii diverging from the umbo to the upper margin of the shell. It is figured by Poli. vol. 2. pl. 19, f. 9, 10, 11, who calls it *Mactra cornea*.

## NAVICELLA.



*Lam. Hist. Nat. des Anim. sans vert. VI. pt. 2. p. 181.*



**TESTA** transversim elliptica, vel oblonga; superne convexa, subtus concava; spirâ nullâ; vertice ad marginem suboblique inflexo. *Labium internum* complanatum, acutum, angustum, edentulum; *externum* acutum, integrum. *Impressiones musculares* duæ, distinctæ, elongatæ. Operculum testaceum, subquadratum, planum, dente laterali, acuto, instructum.



LAMARCK has placed this Genus in a situation which it appears very naturally to occupy, close to his Neritina, to which it indeed seems to bear the same degree of affinity that Ancylus of Müller does to Limnea. In attempting to draw up a generic character for this shell, it will be observed, that we have followed Lamarck very closely, though we are not quite convinced of the propriety of doing so, because, on account of its near affinity to spiral shells, we should gladly have used the terms commonly applied to such, instead of those more commonly used in describing patelliform univalves. The general form of the shells which compose this Genus is, however, so similar to many Patellæ, and the definition, moreover, will be so much more easily understood, that we think we are warranted in continuing Lamarck's application of these terms. We are not aware that there will be any difficulty in distinguishing this Genus from all others; the absence of spiral volutions and the large aperture will separate it from Neritina, while its shelly operculum and the regularity of its form will serve as discriminating characters

## NAVICELLA.

between it and *Crepidula*; and we think no other Genus will be confounded with it.

Shell transversely elliptical or oblong, regular, convex on the outside, but concave within; without a spire, vertex turned downwards to the margin rather obliquely. Internal lip narrow, flattened, sharp edged, without teeth; outer lip entire, sharp edged, extending in young shells beyond the point of the vertex, which in older specimens is commonly eroded. If the shell be held in the position which we have given it in our plate, and which most clearly proves its affinity to *Neritina*, two elongated muscular impressions will be distinctly observed, both of which are transverse and one placed in the upper, the other in the lower part of the inside; and the sharp edged inner lip will become longitudinal. In mentioning the operculum, we feel obliged to notice the opinion entertained by some that it is an internal shelly piece of the animal, at the same time we coincide entirely with Lamarck in opinion, that its similarity in structure proves its analogy with the shelly opercula of *Neritina*, *Nerita*, &c. it is of a squarish form and shelly substance, thin, flat, and furnished with a sharp point proceeding from the side at one corner.

The recent species of this Genus, few in number; are natives of rivers in warm climates, they are brought from India, the Isle of France and the Molucca's: they are naturally covered on the outside with a greenish brown and strong epidermis, beneath which they are marked all over with very dark coloured zigzag lines and triangular spots, so that when the epidermis is taken off, it has the appearance of a black shell with triangular whitish spots. We are not aware of the existence of any fossil species, unless indeed, a little shell, which we have added a representation of to our plate, and which De France calls *Crepidula altavillensis*,\* belong to this Genus.†

We have not hesitated about adopting Lamarck's generic name, for though it was not first published by Lamarck, yet De Montfort was aware of Lamarck's having applied the term *Navicella* to these shells before he published it under that of *Cimber*.

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\* Dict. des Sciences Nat. tom XI. p. 397.

† The examination of several more specimens than we at first possessed, have convinced us that this belongs to *Neritina*.

## VITRINA.



**TESTA** tenuis, hyalina, fragilis, oblonga; spirâ brevi; anfractu ultimo maximo; aperturâ amplissimâ, semilunari, latitudine altitudinem superante, peristomio simplice. Columella linearis, spiralis.



NOTWITHSTANDING the remarkable differences described by De Ferussac in the animals of the two shells we have here engraved, we do not much hesitate to give them as examples of the same genus, partly on account of the extreme similarity between the shells themselves, and partly because De Ferussac's description of the animal of the larger one being taken from a specimen preserved in spirits, it is more than probable that its parts are contracted in such a manner as to alter its general appearance very materially; if future discovery should prove the propriety of disuniting them, we apprehend De Ferussac's appellation of *Helicarion* must be applied to the larger one.

The *Vitrinæ* are very thin, transparent, brittle and glossy shells of an oblong general form; their spire is very short and compressed, scarcely ever consisting of more than three volutions which increase very rapidly in size, so that the last is very much larger than its antecedent volution, and their aperture is very large, its width being generally greater than its length; its edges are not thickened; and it is of an oblong form, having its columellar side deeply emarginate by the last volution: we believe there is no umbilicus in any species, but the columella is a simple spiral line.

## VITRINA.

These beautiful little shells have been mistaken for the young state of our common garden snails, and have been consequently overlooked. Draparnaud has done an essential service to conchology in distinguishing them, and pointing out the peculiarities of their little animal inhabitants, which are considerably larger than the shells themselves, and incapable of entering into them entirely; they are furnished with a divided mantle which spreads over and polishes the shell. They are found among moss and short grass, rather preferring sandy situations, in most parts of the world: one or two species are natives of our country.

Fig. 1. *Vitrina pellucida*, drawn from specimens found near Cork.

2. *V. Cuvieri*. *Helicarion Cuvieri*, De Ferussac. *Hist. Nat. des Mollusques terrestres et fluviatiles*.

No fossil species are known.

## GASTROCHÆNA.

Spengleri Nova Acta Danica, II.

**TESTA** tubicola, bivalvis, æquivalvis, inæquilatera, subcuneiformis, anticè hiantissima hiatu; ovali, posticè attenuato. *Cardo* linearis, marginalis, subdentulus. Vagina tubulosa, testacea, anticè attenuata, aperta, aperturâ bilobâ; posticè in clavam ovatam, clausam, terminata.

THE Genera *Pholas*, *Mya*, *Mytilus* and *Chama*, have by turns served as the receptacle of the shells composing this very distinct and highly interesting Genus; our acknowledgements are justly due to Spengler, for having separated it from all of them, and for distinguishing it as a Genus. Lamarck has adopted Spengler's name, but he has placed it next to *Pholas*, apparently not having known that the animal forms its own testaceous tube, either as a lining to the hollow it has previously perforated, or as a covering for its shell in those instances in which it has not perforated at all, but in which it has taken up its abode, as it frequently does, within some spiral univalve: the fact of the shell being enclosed in a testaceous tube of its own depositing, renders it proper to remove it into Lamarck's family of *Tubicolæ*, to which, indeed, it appears to us to be more nearly related, though we remark a very considerable analogy between the shelly tube of Lamarck's *Tubicolæ*, and the coriaceous epidermis which not only in a great measure covers the shell, but also encloses the tubes of the animal of his *Pholadariæ*, and, consequently, think the two families might very properly be united.

The *Gastrochæna* is an equivalve, inequilateral, rather cuneiform bivalve, being rounded at the anterior



## GASTROCHÆNA.

side, when viewed in front, and acuminated posteriorly; the anterior side gapes very widely, its aperture being rather oval, but pointed behind; the hinge is linear and marginal, and the ligament external, but we do not find any hinge teeth: there is, indeed, a small and indistinct laminated appendage which proceeds from within the umbo, and which Turton has described as a tooth, but we think it should rather be likened to the long curved appendage of *Pholas* than to the hinge teeth of bivalves in general. This bivalve is enclosed in the posterior, clavate extremity of a shelly tube, which is attenuated and open anteriorly, its aperture being oblong, and bilobate or nearly divided into two by a sort of septum which does not quite meet in the center; this double aperture serves for the passage of the two tubes of the animal: the posterior extremity of the shelly tube is closed. This irregular clavate tube, already enclosing the two valves of the *Gastrochæna* is generally found within some other shell to the inside of which it is attached, or it is protected in the ready-formed cavities of shells or rocks, or it lines cavities perforated by the animal itself in rocks, shells or corals, and in this latter case the double termination of the shelly tube projects beyond the surface of the coral or other object in which it is enclosed: we have an Oyster shell in which about a dozen of them have taken up their abode, whose shelly tubes project more or less beyond the surface, but generally in those situations in which they are protected by the irregularities of the Oyster shell.

The *Mya dubia* of *Pennant*, and the *Pholas hians* of *Chemn.* may be considered as the types of this Genus, they are both recent shells, and the former is found on our coasts; we are only acquainted with one fossil species which is frequently found attached to the insides of many of the Grignon shells. *Gastrochæna* is easily distinguished from *Pholas*, by its shelly tube, its ligament by which the two valves are attached, and its wanting the accessory valves.

Fig. 1. A group of the tubes of *Gastr. modiolina*, Lam. one of which being broken shows the two valves *in situ*, from the Mediterranean.

2. A specimen of *Fusus Noë*, from Grignon, cut open to show the clavate tube of a little fossil *Gastrochæna*.

3. A worn fragment of a Madrepore, broken to show the tube formed by a specimen of *Gastrochæna cuneiformis*, Lam.

4 & 5. Two views of the two valves of *G. cuneiformis*, Lam.



## BIROSTRITES.



*Lam. Hist. Nat. des Anim. sans vert. VI. pt. 1. p. 235.*



TESTA inæquivalvis, bicornis; valvis disco elevato conicis, inæqualibus, obliquè divaricatis, subrectis, corniformibus; alterâ alteram basi obvolvente.



THE Birostrites is, indeed, a most singular fossil. According to Lamarck, it is composed of two pieces or valves which do not unite at the edge of their bases, but of which the longer and larger envelopes the other, and the dorsal disk of each is elevated into the form of a nearly straight cone, slightly arched interiorly. These horn-shaped valves are unequal, and diverge obliquely in the form of a V, whose branches form a very obtuse angle, and unite at their bases.

We have copied the character of the Genus from Lamarck, and we have as above endeavoured to translate as correctly as possible the greater part of his observations. He further says, that this Genus is assuredly very different from his *Diceras*, and that the inside of the shell is not known: having, however, formed our own opinion from an examination of a *cast* of the *inside*, we venture to differ from him, and to express our conviction that it ought to be placed next to *Diceras*, or at least in the same family with *Chama* and *Diceras*, (inasmuch as it accords very nearly with those shells in its internal characters,) and that it should not be placed in his family of Rudistes: indeed, the whole family of Rudistes might be struck out, and of the six genera which compose it, we believe *Sphærulites* and *Radiolites* are not shells; *Calceola* most

## BIROSTRITES.

probably belongs to his *Brachiopodes*; *Discina* should be expunged, as being identical with *Orbicula* and *Crania* as we have shown, (Linn. Trans. XIII.) is decidedly a *Brachiopode*.

The principal difference between Birostrite and Diceras appears to consist in the straightness of the horn-shaped valves of the former, while those of the latter are spirally curved. We have given two views of the Birostrites inæquilobus, a fossil whose locality we do not know, nor are we acquainted with the stratum in which it is found. We shall be happy if we should, by publishing this Genus, excite such enquiry as may lead to the discovery of its locality, and any other interesting facts connected with it.

## CONIA.

—◆◆—  
*Leach.* Supp. to Edin. Encyclop.  
 —◆◆—

**TESTA** conica, valvis quatuor æqualibus, latera-  
 liter ferruminatis, composita; apice pervio,  
 basi valvâ testaceâ, affixâ clausa. Operculum  
 bipartitum, valvis quatuor compositum; pari  
 postico prominulo.

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THE *Balanus porosus*, and the *B. purpurascens* of authors are easily distinguished from all other sessile Cirripedes, not only by the numerous pores which are observable in the substance of their shell, but by the cone itself consisting of only four valves, whereas *Balanus*, *Acasta*, *Tubicinella*, *Coronula*, &c. consist of six valves or pieces joined together by their sides: we therefore highly approve of Leach's having separated them from the other *Balani*, under the generic name *Conia*, and we should have been surprized at Lamarck's not adopting it, if we had not observed that he has paid no attention to the number of valves of which the cone is composed, except in two instances, in the characters of *B. pustularis*, where he says, "*radiis sex*;" and *B. crispatus*, where he incorrectly says, "*radiis quinque*."

Shell more or less regularly conical, consisting of four rather triangular, nearly equal valves, joined together by their sides, open at its summit and closed at its base by a testaceous attached valve, which takes the form of whatever substance it adheres to; and consequently, in a great measure influences the general form of the whole, for it is observable that when this is attached to a smooth and even surface, the whole shell is regular in its growth and shows distinctly the *four radii*; on the

## CONIA.

contrary, when this valve adheres to an uneven and rough surface the growth of the whole shell is comparatively irregular: and when the shell is full grown the radii cannot always be traced on the outside. The operculum, as in *Balanus*, is bipartite; it consists of four valves, two of which are anterior, and the other two more prominent valves are posterior; the opening for the passage of the tentacula or feet is between the two anterior valves.

The Coniæ are found attached to rocks, stones, shells, &c. in the Mediterranean, the West Indian and various other seas; we believe none have been as yet observed on our coasts, nor have we ever seen any fossil species.

Our plate represents, at

- Fig. 1. Several young specimens of *Conia porosa* upon a fragment of a Patella.  
2. A group of *Conia porosa* in various stages of growth; in this state it is the *Balanus stalactiferus* of Lamarck, but not the *B. Cranchii* of Leach.  
3. An operculum taken out of one of the specimens of this group.  
4. & 5. Two views of a specimen of *Conia Lyonsii*? Leach's MS.

## SCALARIA.



*Lam.* Hist. Nat. des Anim. sans vert. VI. pt. 2. p. 225.



TESTA turrita, costis longitudinalibus elevatis, subacutis; *apertura* rotundata, peritremate continuo, marginato, reflexo: basi internâ obsoletè subcanaliculatâ. Operculum tenue, corneum, spirale.



ONE of the most interesting of all Genera, on account of the extreme singularity of its numerous ribs, originating in the circumstance of the border of its aperture being turned backwards at frequent periods during its growth. These ribs serve as one distinguishing mark between it and all other turritated univalves, yet there are other Genera which it might possibly be confounded with; these are *Pupa*, and *Cyclostoma*; not that they are related to it, but one of them, the *Pupa*, has even more numerous ribs than the *Scalaria*, but they are not generally so distinct, and the shell may be distinguished by its cylindrical shape: on the other hand, the *Cyclostomata* never form any ribs on their shell, their lip being only reflected at the ultimate state of growth.

Shell turritated, volutions gibbous, very distinct, sometimes quite separated, each succeeding one increasing in size, and all more or less closely covered with longitudinal, elevated, generally rather acute, and oblique ribs; these ribs are sometimes thickened in such a manner as to become distinctly varicose, but, on the contrary, in one or two instances they are very indistinct, and scarcely raised above the shell. The aperture is always nearly round, generally a little longer than it is broad, its edge

## SCALARIA.

thickened all round and reflected, most distinctly so in those species whose volutions do not touch each other; the lower part on the side of the Columella is formed in a very indistinct manner into a sort of canal; this is more observable in some species than in others, but it may be traced in all that we are acquainted with. A thin, horny, spiral operculum closes the aperture.

The principal species of this Genus is the shell that has been so long and deservedly famous on account of its elegance and rarity, namely, the Wentletrap, or Staircase Shell, fine specimens of which in former years have obtained enormous prices; of late they have, however, become more common, though the specimens now brought to England are in no respect inferior to those which formerly produced such very high prices; indeed, most of the species of this Genus are extremely elegant and singular, not only the recent, but likewise the fossil species which occur in most of the strata above the chalk: several are engraved in "Sowerby's Mineral Conchology," from the Crag and London Clay; Lamarck has published others in the "Annales du Museum," vol. 4, from the Calcaire grossière of Grignon; they occur also in the newer formations of Italy, perhaps contemporaneous with our Crag, and these are published in "Brocchi's Fossilia subappennina:" they occur also, but more rarely, in the green sand.

Of the recent species, which are marine, Lamarck has described seven; by the addition of species already known this number might be doubled—and together with the fossil species their number will amount to at least thirty. We have represented

Fig. 1. *Scalaria pretiosa*, Lam.

2. ——— *Clathrus*. *Turbo Clathrus*, Linn. et auctm.

3. ——— *raricosta*, Lam.

4. ——— *australis*, Lam.

5. ——— *foliacea*. This is an hitherto undescribed fossil species found in our Crag, by the Rev. G. R. Leathes; we have named and characterized it as follows:

*Sc. foliacea*, testâ turritâ, anfractibus disjunctis; costis paulum distantibus, tenuibus, latis, foliaceis, reflexis.—From near Woodhall, in Suffolk.

## GALEOLARIA.

*Lam.* Hist. Nat. des Anim. sans vert. V. p. 371.

**TESTA** tubulosa, cylindraceo-angulata, primùm repens, tandem erecto-undata. *Apertura* orbicularis, margine in lingulam spatulatam hinc terminato. *Operculum* orbiculare, (*galeiforme*) valvis testaceis variis superné armatum. Valvæ quinque ad novem, operculi margine hinc affixæ; unica mediana lineari-truncata cæteris major.

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IN presenting to our readers the *Galeolaria*, a Genus but newly created by Lamarck, we cannot avoid expressing our opinion, that however well it may appear to be characterized by the peculiarities of its aperture and its operculum, it cannot be generally adopted, but must eventually merge into Lamarck's *Vermilia*; the variable appearances of whose opercula seem to us at most to present specific and not generic distinctions. Nevertheless, as without a knowledge of the subject, no conchologist will be enabled to determine for himself the propriety of retaining or rejecting the Genus in question, we are glad of an opportunity of giving a representation of it, inasmuch as we believe none has been given in any work before us, if, indeed, we except that in "Bowdich's Elements of Conchology," part 2nd, where the operculum is entirely omitted. But we have a more cogent reason still for giving this Genus a place in our work, it is this, that Lamarck, who appears to have been perfectly aware of its near affinity to *Vermilia*, has only separated these two genera from a persuasion that such peculiarities in the operculum and aperture, joined to the very peculiar

## GALEOLARIA.

general appearance, are indications of particular characters in the animal inhabitant itself, which are sufficient to authorize this separation. In our definition of the Genus we have, however, been obliged to modify the term *erecto-undati* used by Lamarck, because our species is entirely repent, although it accords perfectly with Lamarck's, in the characters of the very singular operculum, and the *languette* of the aperture. In its more advanced stages of growth our species would probably extend its tube so as to become erect or partly so, and those which Lamarck described were certainly repent in their younger state.

The Galeolariæ are marine, they are found in great numbers collected together and forming tufts attached to shells and other marine productions; each one separately considered is an irregularly bent and contorted angularly cylindrical tube, its aperture is orbicular, and the termination at its upper edge is produced into the form of a little tongue, which is more or less spatulate; its operculum consists of an orbicular squamiform piece (said by Lamarck to be also helmet-shaped) to which, on the external margin, are affixed several very small, mostly acute, testaceous valves, from five to nine in number, of which, one which is central is linear and truncated at its extremity, and larger than the others.

Lamarck describes two species of this Genus, which he thinks may perhaps only be varieties; in one the tube is thrice as long as in the other: in our species the tube is shorter than in either of Lamarck's, and attached throughout its whole length, wherefore we have named it *Galeolaria decumbens*; it may be characterized as follows:

*Galeolaria decumbens*; testâ repente, teretiusculâ, dorso obtusè angulato, sulcato, aperturæ lingulâ brevisculâ.

We have never seen any fossil species of this Genus, but there is a representation of a *Vermilia*, in "Sowerby's Mineral Conchology of Great Britain," pl. 30, under the name of *Serpula crassa*, which has a very singularly stellated operculum: it was found in the London Clay, at Highgate.

- Fig. 1. A group of *Galeolaria decumbens* upon a Turbo.  
2. A magnified representation of its aperture.  
3. Its operculum highly magnified.



## BALANUS.

—◆◆◆—  
 Balanus et Acasta, *Leach*.——Balanus, *Lam*.  
 —◆◆◆—

**TESTA** conica, sæpe elongato-conica, valvis senis, inæqualibus, lateraliter ferruminatis, composita; apice pervio, basi valvâ testaceâ, adhærente clausa: valvæ, antica, postica, et duæ ex lateralibus majores. Operculum bipartitum, valvis quatuor compositum; pari postico prominulo.

Specierum spongiarum incolentium, basis pocillum vel patellam referens; Gorgoniis affixarum plerumque elongata lanceolata.

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WE have already expressed our approbation of the general outline of an arrangement of the Cirripedes, published by Leach in the "Supplement to Encyclopædia Britannica;" nevertheless, upon reconsideration, we do not entirely concur with him in separating those species which inhabit sponges, and to which he has given the name of *Acasta*, from the other *Balani*, which he has done merely on account of their (generally) cup-shaped base; the reason for our dissent is, and we think it very conclusive, that we possess specimens of a *Balanus* in sponge, whose base is as flat as those of the common *Balani* generally are; and further, the slightest examination will prove that the bases of all these shells are subject to great variation, and that in all cases they conform themselves to the substance to which they are attached, and to the circumstances in which they are placed. We have observed a remarkable instance of this in a small *Balanus* that has lately been discovered on a *Gorgonia*; where an individual attached to the stem has the common form of a *Balanus*, and another individual which is placed on one of the slender branches has a deeply hollow and much elongated base. We therefore have re-united *Acasta* to *Balanus*.

## BALANUS.

Nothing can be more variable in general form than the Balani; for when they are placed upon a smooth and even surface they become of a pretty regular, rather obtusely conical shape; if, on the contrary, they are placed on an uneven and rough surface, their form is so far governed by their situation, that they become more or less irregular according to the degree of unevenness of the surface to which they are attached: when they are grouped, which is most commonly the case, they sometimes become very much and irregularly elongated, clavate, fistulose, &c. Each Balanus consists of six valves, four of which are nearly equal in size and larger than the remaining two, and all united together by their sides, so as to form a more or less regular cone, whose apex is open and base closed by a testaceous valve, by which it is attached; and it is remarkable, that even when Balani are united together by their sides, it is generally by a lateral extension of this base and not by any part of the six valves which form the cone. The posterior pair of lateral valves are the smallest. The operculum, as in Conia, is bipartite, but it consists of four valves, of which the posterior pair is rather the more prominent.

The Balani, than which perhaps no genus of shells is more common, abound on all kinds of bodies that are at any time covered by the sea: we believe that there are many distinct species, of which, indeed, we have several on our own coasts; those that are found imbedded in sponges have generally a cup-shaped base, and form the Genus *Acasta* of Leach: another sort which has generally an elongated, lanceolate base is found attached to and overgrown by various species of *Gorgoniæ*; this is the *Balanus galeatus* of Lam. and the Parrot's-bill *Lepas* of Ellis.

There are also many distinct fossil species, but they are only found in the newer strata: we have them from Piacenza, Bordeaux, Paris, Essex, &c.

Fig. 1. *Balanus Tintinnabulum* var.

2. ——— *spinosus*.

3. ——— *circinatus*, Defr. Dict. des Sciences Nat.

4. ——— *Montagui*, *Acasta Montagui*, Leach.

5. A variety of the same without spines and having a flat base.

6. *Balanus galeatus*, Lam. coated by a *Gorgonia*.

7. The same uncoated.

8. A small variety of the same from another species of *Gorgonia*, this is exceedingly variable in shape.

## CRANIA.

Retzii et Auctorum.

**TESTA** inæquivalvis, æquilatera (subirregularis) orbiculari-subquadrata, compressa: *valvulâ superiore* patelliformi, *inferiore* affixâ planulatâ. *Impressiones musculares* in utrâque valvulâ, quatuor; quarum duæ in inferiore subcentrales, approximatae, duæ posticæ, submarginales, distantes. *Cardo* edentulus. *Ligamentum* nullum.

A GENUS belonging to the family of *Terebratuloid* shells, the *Brachiopoda* of Cuvier, but placed by Linneans in *Anomia*, where it is united with *Placuna*, the true *Anomiæ* and other shells of very different characters; and by Lamarck among his *Rudistes*, evidently because he was unacquainted with the animal inhabitant. Poli, who has named the animal *Criopus*, has, however, published the detail of its anatomical structure, in which it entirely accords with the rest of Lamarck's *Brachiopoda*; and we have had an opportunity of examining a dried specimen of the animal which distinctly shows its two characteristic fringed arms or tentacula. Lamarck has confounded his own Genus *Orbicula* with it, and indeed almost every author who has touched upon either genus has committed some error; in the 13th vol. of the Linn. Trans. we have endeavoured to unravel the confusion that has been thus created, and to assign to each genus its peculiar characters; the following are those by which *Crania* may be known:

Shell inequivalve, generally equilateral, rather irregular, orbicularly subquadrate and flattish; the upper valve patelliform, having its umbo or vertex rather behind the center; the lower valve attached by its outside, the greater part of it being generally extended over the substance to which it adheres; (and in this respect it dif-

## CRANIA.

fers greatly from *Orbicula*, which is attached by means of a ligament which passes through a fissure in the center of the lower valve.) There are four muscular impressions in each valve; of those in the upper valve, two are near the posterior margin and the other two nearer the center, but not always very near to each other: of those in the lower valve, two are nearly marginal and rather distant, but the other two are nearly central and so close together, that they appear to form but one; they in general have a small projection between them; and the whole of the muscular impressions in the lower valve, are frequently lost by decomposition in the fossil species, so as to appear only three oblique perforations, as Lamarck has described them. The muscular impressions also serve to distinguish *Crania* from *Hipponyx*, which has only two. Not one of the three Genera, *Orbicula*, *Crania*, and *Hipponyx*, has any hinge; nor are the valves of any of the Brachiopoda attached to each other by a ligament at the posterior part, as most other bivalves are. The upper valve of *Crania* has been published as a *Patella* by several authors: that of *C. personata* is the *Patella distorta* of Montagu; this species having been found on several parts of our coasts, as well as in the Mediterranean. We have represented a fragment of a Pinna, from Cork Harbour, Ireland, upon which are two specimens of

Fig. 1. *C. Personata*, Lam. *Anomia craniolaris*, Linn. *An. turbinata*,\* Poli; the inside of the lower valve is shown on one side, and the outside of the upper valve on the other.

2. Is the inside of the upper valve of the same; this is the only recent species we know.

3. Shews the inside of the lower valve of *C. Parisiensis*, Defr., attached to an *Echinus* from the Chalk, in Norfolk; we have never seen the upper valve of this species.

4. Two views of the lower valve of *C. Nummulus*, Lam. the *Nummulus Bratenburgensis* of authors; it is remarkable, that this seems to have adhered only by a small part of its outside; from Sweden.

5. Probably the same species, from Mæstricht.

6. Shows the two sides of the upper valve of a pretty little species from Orglandes, we have called it *Cr. costata*; its peculiar character may be thus expressed; *Cr. valvulâ superiore costis prominentibus, radiantibus, octo ad quindecim*.

7. Inside of *Cr. antiqua*, remarkable for the extension of the posterior part of the shell.

Several fossil species are described by M. DeFrance, in the *Dictionnaire des Sciences Naturelles*.

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\* Poli's figure is referred by Lamarck to *Orbicula*.

## PLANAXIS.

Lam. Hist. Nat. des Anim. sans vert. VII. p. 50.

**TESTA** ovato-conica, solida. *Apertura* ovata, sublongitudinalis. *Columella* basi depressa oblique truncata, sinu perangusto a labro separata. Labrum facie internâ sulcatâ, aut lineatâ, et infra marginem superiorem callo decurrente distinctum. Operculum tenue, corneum.

*PLANAXIS* is a genus of shells lately detached by Lamarck from the *Buccinum* of all authors; he says, "they are marine shells, related to the *Phasianellæ*, but distinguished by their columella being truncated at its base, as in *Melanopsis*. The callosity running under the summit of their right lip seems to bring them near to the *Buccina* and the *Purpuræ*," and, indeed, we may venture to give it as our opinion that the *Planaxes* are much more nearly related to the *Buccina* than to the *Phasianellæ*.

They are ovately conical, thickish shells, whose aperture is rather longer than it is wide; base of the columella depressed and obliquely truncated, and divided from the outer lip by a very narrow canal. The inside of the outer lip is transversely grooved or plaited, and there is a prominent callosity running under the summit of the right lip. The operculum, which Lamarck had not seen, but which we have had an opportunity of observing in one species, is thin and horny.

We know but few species of *Planaxes*, which are all small and generally transversely striated or grooved on the outside, sometimes smooth, and covered with a light

## PLANAXIS.

brown horny epidermis; and sometimes the grooves do not extend far behind the outer lip, so that the back and smaller volutions have the appearance of being worn; and we cannot positively decide whether they are worn, or whether there never have been any striæ on those parts.

Three species are figured in our plate:

Fig. 1. *Planaxis sulcatus*, Lam. *Buccinum sulcatum*, Born.

2. ——— *mollis*, testâ elongato-conicâ, lævi; anfractibus planulatis.

*Obs.*—We have reason to believe this to be an English species, because it has been engraved for “Leach’s British Shells,” but we do not know its locality; it is the only species of which we have seen the operculum or the epidermis.

3. *Planaxis semisulcatus*, testâ oblongâ, subventricosâ, sulcis plurimis transversis, dorso obsoletis; labio externo crenulato.

*Obs.*—Since this sheet was sent to press, we have met with several specimens of this shell with their epidermis and operculum, which plainly prove that there never were any striæ on the back: the operculum is corneous.

We have never seen any fossil species of this Genus.

## NERITINA.



*Lam. Hist. Nat. des Anim. sans vert. VI. pt. 2. p. 182.*



TESTA tenuis, semiglobosa vel ovalis, subtus planulata, non umbilicata. *Apertura* semirotunda; *labio columellari* planulato, margine acutiusculo subrecto, plerumque denticulato; *labio externo* intus nec dentato nec crenulato. Operculum testaceum, semicirculare, internè appendice laterali instructum.



WE entirely concur with Lamarck in the reasons which induced him to separate this from the Linnean Genus *Nerita*, although no former writer had thought proper to distinguish them. Difference of habits, according to Lamarck's hypothesis would necessarily produce diversity of characters, and the prosecution of the enquiry has proved that there do exist such peculiarities in the *Neritinæ*, besides their being inhabitants of fresh water, as are sufficient to distinguish them from the *Neritæ* in any situation, even in a fossil state as inmates of formations of doubtful origin. We shall, however, proceed to detail the peculiar characters of *Neritina*, and then endeavour to show in what particulars it differs from *Nerita*.

The *Neritinæ* are rather thin shells, generally smooth on the outside, frequently covered with a strong horny epidermis of a pale brown to a quite black colour; in general their spire is very short, sometimes it is almost concealed, in a very few instances they can scarcely be said to have any, and it is very seldom that they have a prominent pyramidal spire. The aperture is semicircular, the inner or columellar lip more or less flattened, its edge, which is placed obliquely to the axis of the shell,



## NERITINA.

is more or less sharp and straight and generally denticulated. The columella, together with the inner part of the spire, and even a part of the lip is absorbed by the animal in proportion as it increases in size, whence it appears to have no columella. The inside of the outer lip is neither toothed nor crenulated, but just within the lower part of the aperture it has a slightly elongated, transverse prominence, which appears to be a fulcrum upon which the operculum articulates. The operculum itself is testaceous, covered with an horny epidermis; of a semicircular form, exactly closing the aperture, and furnished internally at the lower end with a dentiform appendage, which, when the aperture is closed, lies between the above-mentioned prominence in the shell and the lower end of the inner lip.

The resemblance in the general form of the shell, in the form of the aperture and in the general characters of the opercula, between *Nerita* and *Neritina*, is very complete; the principal points of difference between these two genera consist in the inner part of the outer lip of *Nerita*, being generally occupied by numerous transverse teeth or plaits: the *Neritæ* are, moreover, generally thicker shells, and are frequently ornamented on the exterior with varied grooves, striæ, tubercles, &c. Both genera are distinguished from *Natica* and from *Helix* by the straight, sharpish, denticulated edge of their inner lip. We do not conceive it necessary to divide *Neritina* into three genera as Montfort has done, for his *Clithon* is a good type of the Genus; and the only peculiarity of his *Theodoxus* is its small internal chamber, separated from the cavity of the spire by a kind of half septum, and apparently formed after the absorption of the columella. Montfort's *Velates* is Lamarck's *N. perversa*.

Many of the recent *Neritinæ* are very pretty little shells, for beneath the epidermis they are frequently ornamented with variously coloured bands, spots, zigzag lines upon a light coloured ground, and sometimes with light-coloured markings upon a dark ground, and it is remarkable that the fossil species frequently retain these varied markings. Like other fresh water shells the apices of their spires are subject to erosion, and sometimes their spires are almost eaten away, but in the parts that are thus eroded, the animal habitually increases the thickness of its shell to avoid sustaining any injury itself.



## NERITINA.

The fossil *Neritinæ* occur in the formations above the London Clay, they abound in company with a great profusion of other fresh water shells in the so called "Upper marine formation," and in those Woolwich beds which are decidedly a mixture of marine and fresh water remains; they are also found profusely in many similar beds in various parts of France, Germany, &c.

In our plate, representations are given of

Fig. 1 & 2. *Neritina Schmideliana*; *N. perversa*, Gmel. and Lam. We have adopted Chemnitz's specific name, because Gmelins is likely to mislead, inasmuch as it is not a reverse shell, though Lamarck says it is.

3. *Neritina Corona*,\* Lam.

4. Inside of the operculum,

5. Outside of the same,

6. *N. pulligera*.

7. A fossil species from Champagne, which we have named *N. callifera*; the following are its characters: — Testa obovata, labio interno supra inferiorem anfractus ultimi partem incrassato-expanso.

Besides these, there will be found a representation of *Neritina altavillensis* in our plate of *Navicella*, which was there placed because we at first considered it to be a species of that genus, but upon repeated examination we were convinced that it really belongs to *Neritina*, and, consequently, neither to *Navicella* nor to *Crepidula*.

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\* The long spines with which this is ornamented are very variable in number; we have a full-grown specimen which has never formed more than one.

1. 1914

1. 1. 1914. In the morning, on the 1st of January, 1914, the first of the year, the weather was very cold and the wind was very strong.

2. 2. 1914. On the 2nd of January, 1914, the weather was very cold and the wind was very strong.

3. 3. 1914. On the 3rd of January, 1914, the weather was very cold and the wind was very strong.

4. 4. 1914. On the 4th of January, 1914, the weather was very cold and the wind was very strong.

5. 5. 1914. On the 5th of January, 1914, the weather was very cold and the wind was very strong.

6. 6. 1914. On the 6th of January, 1914, the weather was very cold and the wind was very strong.

7. 7. 1914. On the 7th of January, 1914, the weather was very cold and the wind was very strong.

8. 8. 1914. On the 8th of January, 1914, the weather was very cold and the wind was very strong.

9. 9. 1914. On the 9th of January, 1914, the weather was very cold and the wind was very strong.

10. 10. 1914. On the 10th of January, 1914, the weather was very cold and the wind was very strong.

11. 11. 1914. On the 11th of January, 1914, the weather was very cold and the wind was very strong.

12. 12. 1914. On the 12th of January, 1914, the weather was very cold and the wind was very strong.

13. 13. 1914. On the 13th of January, 1914, the weather was very cold and the wind was very strong.

14. 14. 1914. On the 14th of January, 1914, the weather was very cold and the wind was very strong.

15. 15. 1914. On the 15th of January, 1914, the weather was very cold and the wind was very strong.

16. 16. 1914. On the 16th of January, 1914, the weather was very cold and the wind was very strong.

17. 17. 1914. On the 17th of January, 1914, the weather was very cold and the wind was very strong.

18. 18. 1914. On the 18th of January, 1914, the weather was very cold and the wind was very strong.

19. 19. 1914. On the 19th of January, 1914, the weather was very cold and the wind was very strong.

20. 20. 1914. On the 20th of January, 1914, the weather was very cold and the wind was very strong.

## CHITON.



**CORPUS** repens, oblongum, convexum, extremitatibus rotundatum, in ambitu cute coriaceâ marginatum; testâ octavalvi in serie unicâ, et longitudinali ordinatâ, dorso incumbente: valvis mobilibus, omnibus, vel plerisque imbricatis, plerumque transversis, laterum extremitatibus cutis margine replicato connexis.



THOUGH in order to describe the peculiar characters of such a genus as the present, we certainly have no occasion for a knowledge of the animal; yet if we would ascertain with precision, its proper place in the conchological system, the shell itself is so singular, that a reference to the characters of the animal is absolutely imperative. In most cases an attainment of this knowledge is attended with great difficulties, but in the present this is not the case, because being composed of several pieces, at least a portion of the animal must be preserved to keep the valves together, consequently the nature of this animal is better known than that of many others; from an examination of its structure, Lamarck concludes, that the *Chiton* (as well as his *Chitonellus*) are very nearly related to the *Patellæ*, and intermediate between his *Phyllidiæ*, (molluscæ without any shell, whose back is covered with a coriaceous skin) and *Patella*: although the accurate and learned Cuvier, whose anatomical researches have contributed so largely to the advancement of conchological science, and who has examined all the above-named genera with great attention, does not discover so near a resemblance between the *Phyllidia* and the *Chiton*, as he does between the *Chiton* and *Patella*. The position of the branchia, surrounding the body beneath the mantle, is

## CHITON.

certainly very nearly the same in all. But not to enter into anatomical detail, we proceed to state that the *Chiton* is a more or less elongated oblong body, rounded at its extremities, whose upper edge is surrounded by a coriaceous skin, (sometimes beset with fine hairs, sometimes with long spines, and sometimes with small tubercles;) whose back is rather convex and covered with a single row of eight testaceous, moveable, imbricated, generally transverse pieces or valves, the sides of which are fixed down by the edge of the surrounding skin; in some species the valves are not *all* imbricated nor transverse, but the posterior ones are placed at a small distance from each other, and are rather longer than they are broad; these are Lamarck's *Chitonelli*, which we, therefore, do not think sufficiently different to constitute, for those reasons only, a distinct genus. Lamarck informs us, that some of the species have more, and others fewer than eight testaceous pieces, but we have never seen any such specimens, nor do we think they exist; and it may be observed, that he only describes a few species, all which he expressly says have eight valves.

There are many species of *Chitones*, which are all marine, found creeping on stones and rocks, and attached to various submarine bodies, particularly in the southern latitudes; several small sorts are common on our shores; one of the most interesting of these is the *Ch. fascicularis*, which has a little bundle of hairs placed at the lateral extremities of each plate. The largest *Chiton* known is the *Ch. Gigas*, found at the Cape of Good Hope, and one of the most curious is the *C. spinosus*, from the South Seas.

In our plate we have given,

Fig. 1. *Chiton spinosus*.

2. *Ch. squamosus*, from the West Indies.

3. *Ch. fascicularis*.

4. *Ch. striatus*, *Nob.* *Chitonellus striatus*, *Lam.*

5. The eight detached valves of *Ch. cruciformis*, *Nob.* *Chitonellus lævis*, *Lam.*

The fossil species are rare; detached valves are sometimes found in the Calcareous Sand of the neighbourhood of Paris, and in our Crag.

## TURRITELLA.



**TESTA** turrita, spirâ plerumque elongatâ: *aperturâ* rotundatâ, integrâ, (*marginibus* *superné disjunctis*;) labio externo sinu emarginato, basi internâ subcanaliculatâ. Operculum orbiculare, corneum.



SEPARATED by Lamarck from the Linnean *Turbines*, on account of the generally elongated form of the *Turritella* and the sinus in their outer lip. The characters of the aperture are also sufficient to distinguish them from Lamarck's *Terebra* and *Cerithium*, (a part of the Linnean genera *Buccinum* and *Murex*,) which they very much resemble in their general form, and to which, we believe, they are more nearly related than Lamarck seems to think; for, on the one hand, we think we can perceive an evident transition from the *Scalariæ* to the *Turritellæ*; and on the other, from the *Turritellæ* to the *Cerithia* and *Terebræ*: we are not, therefore, surprized, that former Conchologists should have classed the whole together under the name of *Screw Shells*, although there is, indeed, a considerable difference in the form of their apertures.

The *Turritellæ* are marine shells, whose animal is furnished with an orbicular, horny operculum; their spire is more or less turriculate, sometimes consisting of a great number of volutions and very much elongated; the greater number of species are externally furnished with numerous striæ or ridges, and the lower part of the volutions in some is strongly carinated, so as to be wider than the next volutions, and to hang over them like the eaves of an house; but they are not known to have either vertical ribs, nor varices, nor spinose tubercles. Aperture circular, entire, its edges (*disunited above*) not reflected; outer lip with a more or less deep sinus, generally near the upper part, which, on account of various accidents, is not always dis-

## TURRITELLA.

tinct, but an attentive examination of the striæ of growth will always prove its existence; the lower part of the outer lip becomes more prominent in proportion as this sinus is deep. Besides the above-mentioned sinus, there is also a more or less distinct canal at the lower and inner part of the lip, this canal is not reflected, but the lip is here turned a little outwards, though not backwards; this, Lamarck, does not, indeed, seem to have observed, excepting in some fossil species, although in his *T. exoleta* it is very strongly marked; in all it is more distinct than in *Scalaria*. This, as well as the sinus in the outer lip, is not so easily observable in our common English species, which we call Turbo Terebra, as in most others; but it is to be remarked, that we do not commonly meet with this shell in a perfect state. The species of Turritella, are not usually umbilicate; indeed, we know but of one species, the *T. perforata*, Lam. that is so.

Of recent species, we believe, there are a considerable number; but they are difficult to distinguish from each other, on account of the variability of the ridges and striæ on the outside. The fossil species are also numerous, they are found in considerable numbers in the Green Sand, London Clay, and in most of the newer beds: as at Grignon, Bordeaux, Barton, and most other places where these beds occur.

Fig. 1. *Turritella duplicata*, a common species, the Turbo duplicatus, Linn. but exceedingly variable in its ridges; this is generally admitted in the catalogues of British shells, but as we apprehended without sufficient reason.

2. *Turritella sulcata*, Lam. a fossil species from near Paris.

3. ——— *exoleta*, Lam. remarkable for the concavity of the center of its volutions.

4. *Turritella sinuosa*, testâ turrîtâ, costis transversis obtusis; sinu labii externi magno, basique emarginatâ.

*Obs.*—An hitherto undescribed fossil species from Bordeaux, where it is found with many other shells in a kind of yellow sand, the form of its aperture is rather peculiar.

5. Operculum of the common English Turritella, which we commonly call Turbo Terebra; it does not agree with Lamarck's *Turritella Terebra*; but more nearly resembles his *T. cornea*.

## CINARAS.



*Leach.* Supplement to Encycl. Brit.



**CORPUS** pedunculatum, tunicâ membranaceâ penitus obvolutum: tunicâ supernè turgida, infra apicem anticè aperturâ hiantè; valvis testaceis quinque, oblongis, separatis, corpus non penitus tegentibus, duabus ad latera aperturæ, unicâ dorsali, cæteris terminalibus.



THE portions of shelly matter, on account of which this is admitted to a place in our work, are indeed very small, but the animal is in every respect so nearly related to the other pedunculated *Cirripedes*, that even if they were much smaller, as in *Otion*, we should still be compelled to admit it. Because the animal has so far the advantage in point of size over the testaceous valves that accompany it, and because we believe these valves are never seen detached from their animal, we are necessarily obliged, in forming the character of the Genus to have recourse to its general form; it may therefore be described as a pedunculate body, covered with a membranaceous skin, which becomes gradually clavate upwards and has an aperture for the passage of the numerous ciliated tentacula, placed in front just below the summit: testaceous valves five in number, oblong, separated, not covering the body, two placed one on each side of the lower part of the aperture, one on the back and two at the summit immediately above and behind the aperture. The form of these valves will be better understood by reference to our plate, in which we



## CINARAS.

have given representations of them when detached from their membranaceous covering, than by any particular description we can give.

It seems to be rather doubtful whether the *Cinaras* ought to be admitted into the catalogue of British Testacea, because, though it has been found on our western coasts, it appears to have been introduced by West Indian vessels, to whose bottoms it is frequently found attached, by the base of its peduncle, in company with many other *Cirripedes*. Not more than three or four species of *Cinaras* appear to be known; Leach mentions three, one of which is in the collection of the Royal College of Surgeons, attached to the tail of a water serpent.

- Fig. 1. A small group of *Cinaras vittatus*.  
2. The lateral testaceous valves.  
3. The dorsal valve.  
4. The terminal valves.

## OTION.



*Leach.* Supplement to Encycl. Brit.



**CORPUS** pedunculatum, tunicâ membranaceâ abruptè ventricosâ supernè obtectum; anticè aperturâ hiantè. Tubi duo, subcylindrici, retrorsum versi, truncati, extremitate pervii, ad apicem tunicæ. Valvæ testaceæ quinque, separatae, duæ semilunatae ad latera aperturæ, unica minutissima dorsalis, cæteræ pariter minutissimæ, terminales.



THE *Lepas aurita*, Linn. may be considered as the type of this most singular Genus, which is distinguishable from *Cinaras*, not only by its tubular corniform terminal processes, but by its being almost destitute of the dorsal and terminal shelly valves; indeed these are so minute that Lamarck has overlooked them, and described it as quite destitute of them; but Leach has not failed to observe and mention them in his account of the *Cirripedes* in the "Supplement to Encyclopedia Britannica."

The Otion is a pedunculate body covered with a membranaceous skin, of which the upper part is abruptly ventricose, and has an aperture for the passage of the numerous fringed arms, or tentacula, placed in front just below the summit. Two irregularly cylindrical, truncated, open, reflected tubes, are conspicuous on the upper posterior extremity; these appear to be very variable in size in the different species, but they are always a very remarkable character. There are five small testaceous valves, all widely separated from each other; two of them which

## OTION.

are semilunar, are placed, one on each side of the lower part of the aperture;\* one, which is exceedingly minute, and not always testaceous, according to Leach, but sometimes corneous, is placed on the back; the two others, which are also very minute, are placed one on each side of a little fissure at the top of the aperture: according to Leach, these also are sometimes horny.

Several recent species of this very curious genus are described; we are of opinion that they cannot fairly be looked upon as natives of our coasts, though they have been found on them, because we think they have been introduced from foreign climates; we have seen two fine groups, attached to specimens of *Coronula Diadema*, preserved in spirits in the Museum of the Royal College of Surgeons; from one of these, Ellis's figure published in the "Philosophical Transactions" for 1758, appears to have been taken, and the *Coronula Diadema* is known to be a parasite on the *South Sea Whales*.

This Genus is only found in a recent state.

- Fig. 1. Otion Cuvieri.  
2. The lateral testaceous valves  
3. The dorsal valve.  
4. The terminal valves.

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\* We must observe that in this Genus, Lamarck says the aperture through which the tentacula pass is lateral, but speaks of it as anterior in *Cinaras*; to our view its situation in both is perfectly analogous; indeed we consider it as *anterior* in all the *Cirripedes*.

## PARMACELLA.



**CORPUS** repens, oblongum, dorsi mediali subgibbo scutellifero; parte posticâ caudiformi, lateribus compressâ, supernè acutâ. Scutellum ovatum, carnosum, posticè corpori adhærente, testamque recondente, anticè penitus liberum, margini dextro medio emarginatum.

Testa parva, compresso-cochleariformis, spirâ brevissimâ, papilliformi, basi coarctatâ: spiræ aperturâ minimâ: labio externo subirregulari, expansissimo.



A GENUS instituted by Cuvier, and adopted by succeeding authors; it was first discovered by Olivier, in Mesopotamia, and by him sent to Cuvier, who subjected it to an attentive examination, and ascertained the existence of the little shell under the fleshy scutellum on the back of the animal. A second species has since been found in Brazil, and described by De Ferussac, but neither of these authors has favoured us with a general description of the shell; and the latter, whose representation of it is the only one we have seen, has drawn his figure from an incomplete specimen. Bowdich's figure is a mere copy of one in Cuvier's plate, and shows no more than an outline of that part of the animal from whence the shell has been taken, and not the shell itself. We on the contrary have never seen the animal, but from the account of it given by Cuvier and De Ferussac, we are enabled to present our readers with a succinct description of it, which, however, will we think sufficiently enable them to understand the position of the shell. In general form this animal bears a

## PARMACELLA.

near resemblance to a common slug, but is more compressed, and instead of its scutellum being placed on the anterior part near the head, it will be observed upon a gibbosity in the middle of its back: this scutellum is ovate and fleshy and adheres to the body by its posterior part, under which the shell is placed; its anterior margin is quite free.

Shell small, like a very flat bowl of a spoon, with a very short papilliform spire, contracted at its base, the aperture of its spire very small, but the outer lip very much spread out and rather irregular. The specimens which we have been so fortunate as to meet with are covered on the outside with a light brown, thin, horny epidermis. As far as we can judge from the very incomplete accounts of the shell given in former works, ours is a distinct species; but for the same reason which prevents us from deciding that point, we are unable to give its specific distinction, and must therefore be content with simply naming it. The Genus differs from *Limacella* in its spiral shell, and from *Testacella* in being internal. It is an inhabitant of the land. Not known in a fossil state.

Fig. 1 and 2. Two views of *Parmacella calyculata*, natural size.  
3. The inside magnified.

*Obs.*—The specific name *calyculata* is given on account of a little testaceous ridge which surrounds the aperture of the spire, forming a little cup.

## ORBICULA.



Orbicula et Discina.

*Lam.* Hist. Nat. des Anim. sans vert.



TESTA inæquivalvis, subirregularis, suborbicularis, compressa, *valvulâ superiore* patelliformi; *inferiore affixâ, planulatâ: impressiones musculares*, in utrâque valvulâ, quatuor, *duæ* majusculæ, approximatae, subcentrales, *duæ* minores, posticae, submarginales, distantes. *Fissura* ligamenti adhæSIONIS, in valvulâ inferiore, subcentralis, processu obtusiusculo intus terminata. *Cardo* edentulus. *Ligamentum* cardinis nullum.



THE Genus *Orbicula* was established by Lamarck in 1801, but as his character of it was taken entirely from Müller's plate of *Patella Anomala* in "Zoologia Danica," and not from the shell itself, it was necessarily very incomplete, and Lamarck was himself almost unacquainted with his own Genus. Subsequently we have had an opportunity of examining many perfect specimens, which have enabled us to give an amended generic character and several observations, which are published in the 13th vol. of the "Transactions of the Linnean Society," where we have also endeavoured to clear up some confusion which has been created by the mistakes of several authors, and where we have shown that Lamarck's new Genus *Discina* ought to be entirely expunged, as being actually formed from some specimens of *Orbicula Norvegica* which we sent to him.

## ORBICULA.

Shell inequivalve, suborbicular, generally rather irregular, and conforming itself to the inequalities of the substance to which it is attached. Upper valve compressedly patelliform, its vertex posterior: *lower* valve attached, flat, and thin. Four muscular impressions in each valve, two of which are large, approximate and near the center, and two smaller, more distant and near the posterior margin: those in the *lower* valve are seldom so distinct as those of the *upper*. A fissure for the passage of the substance by which the lower valve is attached is seen near its center, and a rather obtuse shelly process is placed at the inner extremity of this fissure. There are no hinge teeth, nor is there any ligament.

The animal of the *Orbicula* has two fringed arms, like those of *Crania*, *Terebratula*, &c. it therefore belongs to Lamarck's family of *Brachiopoda*; we have never seen it but in a dry state, but even then its arms are quite distinct, and their fringe sometimes extends beyond the closed edges of the shell.

Besides the two recent species figured in the "Linn. Trans." we have never seen any other, unless indeed some small and very regular specimens which we have seen attached to a common Pearl Oyster, and of which we have represented one in our present plate, belong to a distinct species: this is a point we cannot decide, and must therefore leave it until we have an opportunity of examining more specimens. Nor have we any positive evidence of the existence of fossil species, though the *Patellæ latissima et lævis* of "Sowerby's Mineral Conchology," t. 139, may possibly be the upper valves of *Orbiculæ*.

Fig. 1. *Orbicula lævis*, upon a rolled flint pebble, and accompanied by the roots of an *Isis*.

2. Under side of the attached valve showing the fissure.
3. *Orbicula Norvegica*, outside of the upper valve.
4. Inside of the same.
5. Inside of the lower valve of the same.



## CLAVAGELLA.

*Lam. Hist. Nat. des Anim. sans vert.*

VAGINA tubulosa, testacea anticè attenuata et aperta, posticè in clavam ovatam, subcompressam, tubulis spiniformis irregularibus echinatham terminata : clavâ alteram valvam parieti infixam alteram intra tubum liberam exhibente.

LAMARCK tells us that "*Clavagella* is evidently intermediate between the *Aspergillum* and *Fistulana*;" and we are happy to have it in our power to confirm this observation, for it is to the partial resemblance between *Aspergillum* and *Clavagella* that we are indebted for the discovery of the only recent specimen of this latter Genus that we know of; a discovery which we were favoured with the opportunity of making through the liberality of our obliging friend John George Children, Esq. at the British Museum. We had long since observed the likeness between the open end of the specimen engraved in our plate and the same part of the tube of *Aspergillum*, and this likeness was so great, that we actually took it for a specimen of an *Aspergillum* enclosed in a mass of stone, and consequently directed our principal attention to the lower part, when, upon removing some of the earthy matter which surrounded it, we were not a little gratified at finding one valve loose in the clavate part of the tube, and tracing the edges of the other attached to the inner surface of the tube. The discovery is the more interesting to us, inasmuch as we are thereby confirmed in our opinion respecting the natural affinity of *Aspergillum* with Lamarck's other *Tubicolées*; not only in structure, but also

## CLAVAGELLA.

in habit. Clavagella consists of a shelly tube or sheath, rather attenuated and open anteriorly, irregularly ovate, subcompressed, clavate and closed at its lower extremity, excepting by a number of irregular minute tubes: in one side of this clavate extremity an irregular, thin, flattish, pearly valve is *fixed*; another, also extremely irregular, is found loose in the bottom of the tube; this valve we have reason to think is united to the fixed valve by means of a ligament when the animal is living; for, we observe, what we conceive to be the remains of such a ligament at one edge; there is also near one side an irregular muscular impression. The external appearance of the lower part of the tube could not be shown in the principal specimen, because of its being surrounded by earthy matter; we have therefore copied one of Lamarck's figures of *Cl. echinata*, which shows the outside of the attached valve and the spiniform tubes very distinctly, the specimen from which this has been drawn is evidently broken at its upper end, and, therefore, does not show the foliaceous reflected edge of the aperture of the tube, which led to the discovery of the real nature of the specimen in the British Museum.

The tube of Clavagella appears, like that of *Gastrochæna*, sometimes to be free, and sometimes to line cavities formed in submarine bodies by the animal.

- Fig. 1. *Clavagella aperta*.  
2. Its aperture seen from above.  
3. Outside of the loose valve.  
4. Inside of the same.  
5. *Clavagella echinata*, Lam.

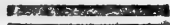
## HIPPOPUS.



*Lam.* Hist. Nat. des Anim. sans vert.



TESTA æquivalvis, regularis, inæquilatera, subtransversa vel longitudinalis, lunulâ clausâ, margine sinuoso. *Cardo* dentibus duobus compressis, elongatis, inæqualibus, anticis, in valvâ alterâ; tribus, quorum unus obsoletiusculus in alterâ. *Ligamentum* marginale, externum.



THE *Hippopus maculatus* of Lam. *Chama Hippopus* of Linn. has long been deservedly esteemed by collectors; when fine it is certainly a very ornamental shell. Lamarck has separated it as a Genus from his *Tridacna*; on account of the edges of the two valves nearly meeting all around; while in *Tridacna* there is a large opening, for the passage of tendinous fibres by which it adheres to the rocks. Whether the *Hippopus* also attaches itself in the same manner to the rocks or not we have not the means of ascertaining; Lamarck seems to think it does not, because the lunule is closed, but we know several genera which do attach themselves to the rocks, stones, &c. by a byssus and yet have not so much space left between the valves for its passage as this has.

Shell equivalve, inequilateral, regular, subtransverse or longitudinal, the greater part of the margin more or less deeply sinuous, and not gaping behind. All that we have ever seen are covered on the outside by larger or smaller radiating costæ, which are frequently crossed at various intervals by irregular rows of small, sometimes

## HIPPOPUS.

almost tubular spines. In one valve there are two compressed, irregular, elongated teeth placed just within the linear margin to which the ligament is attached, and in the other valve a third rather obsolete tooth. Ligament external, marginal.

There is certainly no genus with whose characters and habits, the shells we have represented at fig. 2. agree so well as with this; they have been placed in different genera by Lamarck, which proves that he has entertained some doubts about their proper situation; he has at length united them with several others of similar general characters in *Cardium*; with which, however, they do not at all accord: formerly he had placed them with *Cardita*, to which, indeed, they are more nearly related, and in our view they prove a manifest affinity between *Cardita* and *Hippopus*. There are only two circumstances in which our fig. 2. differs from Lamarck's *Hippopus*; the first is, that it is rather a longitudinal than a transverse shell; the other is in the muscular impressions, of which it has one, very distinctly marked but small, and placed close to the umbo behind it; this we cannot trace in *Hippopus maculatus*, but it should be remarked, that in many specimens of this shell that we have examined, it has been extremely difficult to trace the muscular impressions, as well as the impression of the muscle of attachment of the mantle; in fact, the whole forms but one impression surrounding the edge at a distance, and becoming larger towards the center, and in one specimen we think we can discover the corresponding impression to the one mentioned in fig. 2.

The only recent species known, is the *Hippopus maculatus*, fig. 1. For the reasons given above, we do not hesitate at naming the fossil shell, fig. 2., *Hippopus avicularis*; there are two or three other fossil species resembling this in general form; such is the *H. cymbularis*, *Cardium cymbulare*, Lam. All these fossils are found near Paris.

## ACHATINA.



**TESTA** ovata vel oblongo-ovata, interdum elongata, spirâ elevatâ. Apertura integra, longitudinalis, labio externo tenui, nunquam reflexo; columellâ lævi, simplice, basi truncatâ.



VERY properly separated by Lamarck from the Linnean *Bullæ*, as well as from Bruguières *Bulimi*. Conchology has made such rapid progress since his time, that students of the present day are astonished that Linné should have united so many shells of different characters and habits under one generic term. We, for our part, are certainly surprized that so well characterized and distinct a Genus as that under consideration should be thought unnecessary, and yet may very probably incur a directly opposite censure for having comprised among our *Achatinæ*, shells which have by some been thought sufficiently distinct in character to constitute several genera. Lamarck himself, notwithstanding he is charged with too great a fondness for innovation in this particular, shall furnish us with a reason, which we who wish to avoid the possibility of such a charge most gladly adopt, it is "that the establishment of new genera, without absolute necessity, is a real inconvenience to science," and he pleads this as a reason for not separating some of the very shells which we have here united.

The general form of the *Achatinæ*, is ovate or oblong, sometimes with a lengthened, elevated spire; their aperture is entire and longitudinal, being seldom more than half the length of the shell and frequently much less; the outer lip is thin, never incrassated nor turned outwards,

## ACHATINA,

(but in some species it has an undated margin, and those species are the Polyphemi of Montfort); the inner lip does not spread far over the lower part of the last volution, and the columella is smooth, free from teeth or folds, and truncated at its lower extremity; this latter joined to the thin edge of the outer lip, forms the essential character of the Genus and existing in all that we here combine in it, serves also to distinguish it from others, particularly from *Bulimus* which resembles it in general form.

The Achatinæ are the largest of all known land shells; many of them, such as *A. Zebra*, are naturally covered with a strong epidermis: others on the contrary, the *A. virginea* for instance, appear to be destitute of it; some are constantly reverse shells, such are the large dark brown African Achatina, which we believe Lamarck calls *A. bicarinata*, and the *A. Columna*, *Helix Columna*, Linn.; this last is perhaps one of the most singular of land shells, its columella forming a winding pillar, visible within to the very summit of the spire; it is the *Tiger Lendix* of English Collectors, and the *Colonne torse* of the French.

The greater number of Achatinæ are African shells; some are West Indian, and a very few European; among the latter we can only lay claim to one as decidedly a native of this country, the *Achatina Acicula* of Lam., *Buccinum terrestre* of some English Authors. We hesitate to consider as decidedly British, a little shell that we believe belongs to this Genus, found by that acute and zealous naturalist, Mr. Miller, in pine-beds, at Bristol.

In our plate we have represented three shells belonging to the three divisions of the Genus:---

Fig. 1. Is one of the ordinary character, whose aperture is about half the length of the shell, it is the *A. purpurea* of Lam. *Bulla purpurea*, Dillw.

2. *Achatina virginea*, whose aperture is scarcely longer than it is wide, and not nearly equal in length to the spire.

3. *A. leucozonias*, Lam. *Voluta leucozonias*, Dillw.; one of the Polyphemi of Montfort, whose outer lip is undated, and the aperture proportionably longer than usual.

## ROTELLA.

Lam. Hist. Nat. des Anim. sans vert. vii. p. 6.

TESTA subdiscoidea, orbicularis, nitida; spirâ brevissimâ, depresso-conoideâ; facie inferiore convexâ, callosâ; aperturâ obliquè subtrigonâ, labio externo acuto, basi subprominulo. Operculum corneum, spirale, orbiculare.

A PRETTY Genus, consisting of a few species, separated by Lamarck from the Linnean *Trochus*; its type is a very common but elegant little shell, the *Tr. vestiarius*. While, on account of the very circumscribed character of the genus we approve of the separation thus suggested by Lamarck, we are at a loss to discover a reason for his altering the specific name of the first species from *vestiarius* to *lineolata*; wherefore we choose rather to retain the former specific name and call it *Rotella vestiaria*: nothing can be more variable in its colouring on both sides than this little shell, for which reason we cannot approve of the term "*infimâ facie albâ*," used in the specific character by Lamarck.

Shell rather discoid, orbicular, generally shining; spire very short, of a depressed conical shape, the inferior disk more or less convex, with a central, generally much expanded callosity covering that part which in other discoid shells forms the umbilicus. The aperture is generally obliquely triangular, sometimes almost square, with rounded angles and the lower part of the outer lip is rather prominent, so as to form between it and the umbilical callosity an indistinct notch. It has an orbicular, spiral, horny operculum, very much like that of the Linnean *Trochus Niloticus* and *Turbo Pica*.



## ROTELLA.

Found in the seas of tropical climates, a circumstance in which it differs from the *Helicinæ*, which are land shells, whose lip is reflected and whose callosity does not expand far beyond the umbilicus; its operculum, moreover, is obtusely triangular and not spiral; Lamarck, therefore, judiciously excluded the *Rotella* from the *Helicina*, with which he had formerly united it.

A little fossil shell occurs, in a stratum similar to the *Calcaire grossière* of the Paris basin, at Hauteville, near Valognes, which we do not hesitate to refer to this Genus, although it has a minute umbilicus pierced as it were through the umbilical callosity, and its aperture is rounder: it is the *Turbo Helicinoides* of DeFrance. Several Lias fossil shells, published in "Mineral Conchology," tab. 10. 273 and 285, are more nearly related to this Genus than to *Helicina*, but they all have evidence of a sinus in the center of the outer lip, in which respect they neither agree with *Helicina* nor *Rotella*; though we possess a *Rotella* with a very slight indication of it.

- Fig. 1. *Rotella monilifera*.  
2. ——— *vestiaria*.  
3. ——— *aucta*.

## AVICULA.

Avicula et Meleagrina, *Lam.*

**TESTA** extra plerumque squamifera, nonnunquam submutica, inæquivalvis, rotundato-subquadrata, basi transversa, recta, extremitatibus plerumque productis, nonnunquam brevibus, anticâ interdum caudiformi: valvâ sinistrâ ad basim angustatâ, emarginata. *Cardo* plerumque dente in utrâque valvâ infra umbones. Area ligamenti marginalis, linearis, angusta, medio dilatata. *Impressiones musculares* plures, una subcentralis, suborbicularis, magna, cæteræ minimæ, in seriem interruptam ordinatæ, umbonem versus decurrentes.



It is not without the strongest conviction of the propriety of combining the two Lamarckian genera *Avicula* and *Meleagrina* in one, that we have taken our resolution, and we think we have every evidence that can possibly be adduced in support of our opinion. In detailing the characters of our *Avicula*, we shall therefore endeavour to point out and elucidate those particulars in which we think Lamarck has erred in separating them. Both these Lamarckian genera are placed by Linneans in *Mytilus*, but it would now be almost needless to enumerate the characters by which they are to be distinguished; the general form and the inequality of the valves are alone sufficiently discriminative marks.

The general form of these shells is rather square, with the superior angles rounded; in the Lamarckian *Meleagrinae* it is nearer to orbicular than in his *Aviculæ*, which are rather more transverse, but there is decidedly a transition in form: the two valves are unequal, in the *Aviculæ* rather more conspicuously so than in the *Meleagrinae*, but distinctly so in both, and particularly in the pearly part within. The base or hinge line is transverse, straight, its extremities sometimes very short, as in the *Meleagrinae*, but very variable in length, and sometimes

## AVICULA.

excessively prolonged. The left hand valve is contracted and notched at the posterior side near the base; this is also the case with the right hand valve but not nearly in so eminent a degree: this sinus or notch is for the passage of the byssus by which they fix themselves. There is commonly a single small tooth in each valve, just within the *umbones*: contrary to what Lamarck has stated, we observe this little tooth very frequently in his *Meleagrinæ*, particularly when in a young state, and we may also remark it is not always to be found in his *Aviculæ*. The ligamental area is marginal, linear, narrow, dilated in the center; (in old shells this dilatation is very conspicuous and forms an obliquely trigonal pit, commencing immediately below the umbones, and gradually increasing in width towards the center of the shell); and this is not peculiar to the *Meleagrinæ*, but also strongly characteristic of *Avicula*. There is another circumstance which Lamarck dwells upon as evidencing peculiarity of character in *Meleagrina*; it is the rows of imbricated scales on the outside; but, unless these have been worn off by attrition or the file, these are also common to his *Aviculæ*; and we have represented one which has them produced into the form of longish flattened spines. Muscular impression, nearly central, suborbicular, large, with a row of minute ones running from the inner edge to the umbo. The external parts of the shell in both consists of a foliaceous substance composed of perpendicular fibres; the internal of a brilliant pearly substance.

The species of this marine Genus appear to be rather numerous, though they were all placed in only two species by Linné, his *Mytilus Hirundo* and *Margaritiferus*, or the *Swallow Muscle* and the *Pearl Muscle*---the latter being the shell from which the Oriental pearls are obtained, and being itself the substance commonly called *Mother-of-pearl*.

Of fossil species a few occur, particularly in the London clay, and the strata identical with it.

We have been obliged to give two plates in illustration of this Genus in which

Fig. 1. Represents the two valves of *Avicula heteroptera*? Lam.

2. A specimen of *Avicula aculeata*; *testâ obliquâ, oblongâ, aculeatâ, aculeis compressis, subimbricatis, confertiusculis, subdepressis; caudâ longiore, spiniferâ*.

3. *Avicula margaritifera*, a small specimen; this shell sometimes grows to a considerable magnitude.

## ANCYLUS.

—◆—  
*Müller.* Hist. verm.  
 —◆—

**TESTA** tenuis, obliquè conica, patelliformis;  
 apice subacuto, posticè inflexo; aperturâ ovali,  
 marginibus simplicissimis.

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A LITTLE Genus of fresh water shells, first separated from the Linnean *Patella* by Müller. Several succeeding authors have seen the propriety of this separation, and have consequently adopted it: nevertheless it is not easy to point out any good character by which it may be distinguished from the true *Patellæ*, if we except the position of the apex which in this is turned backwards, and in *Patella* forwards; and the differences in the little animal inhabitant, which in *Ancylus* nearly resembles that of *Limnea*, which differs very materially from that of *Patella*, and for this reason we approve of Draparnaud's placing it next to *Limnea* in his systematic distribution, and wish Lamarck had in this respect followed Draparnaud: it is, however, but justice to the last-mentioned celebrated conchologist to add, that he has only placed it provisionally as an appendix to the family which he designates by the term *Calyptraciens*. Shell thin, obliquely conical, patelliform; apex or vertex, rather pointed, not lengthened nor spiral, turned backwards, and if we observe the shell in an analogous position to that in which we are generally accustomed to place it, we shall find that its point is also turned a little upwards: we have in our plate assigned this position to both species, in order the better to explain

## ANCYLUS.

the analogous position of its several parts with those of other univalves from which it principally differs in wanting spiral volutions. Aperture oval or oblong, with very entire edges.

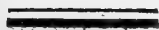
Of this Genus two species only are known which are the *Patellæ lacustris* and *fluviatilis* of Linn., one of which has an oval and transverse aperture, and the other, when placed in a similar position, an oblong and longitudinal aperture. Both are common in this country. Draparnaud describes a third species under the name of *Ancylus spina-rosæ*, which, however, has been most satisfactorily proved by M. De Ferussac to belong to a Linnean *Moniculus*, one of the *Crustacès Branchiopodes frangés* of Lamarck, which is furnished with two equal valves that open and shut like a little muscle; and we regret to find that, since this has been made known, Lamarck should have inadvertently continued Draparnaud's mistake.

Not known in a fossil state.

## HALIOTIS.



TESTA auriformis, lata, sæpius planiuscula, spirâ brevissimâ, depressâ sublaterali. *Aper-tura* amplissima, ovata. *Discus* serie forami-num, labio columellari parallelo, pertusus, *Columella* plerumque planulata. Testa intus margaritacea.



WITH the exception of a few that are commonly known by Collectors and Linneans as *Imperforate Ear-shells*, the Genus *Haliotis* has not suffered any dismemberments. An attempt has indeed been made by Montfort to separate from the genuine *Haliotides* two or three species under the name of *Padollus*, in which he has been followed by Leach, but as far as respects general adoption this attempt appears to have been as unsuccessful as it was unnecessary. Not so the separation of the *imperforate Haliotides*, which are easily distinguished by wanting the row of perforations so very characteristic of the true *Haliotis*.

The name of this Genus is taken from its general resemblance in form to an ear; it is commonly ovate, sometimes nearly round and sometimes oblong, generally broad and rather flat, with a very short, for the most part depressed, rather lateral spire: the aperture almost as large as the shell, ovate or oblong, mostly entire, not quite so in those species called *Padollus*, by Montfort, on account of the longitudinal grooves in their disks. A series of perforations parallel to the columellar margin is remarkable in the disk of the shells of this Genus: as the animal increases in size the smaller of these perforations or those nearest the spire become closed, so that there are seldom more than seven or eight open at one time;

## HALIOTIS.

and Lamarck particularly directs our attention to the observation, that until the last of these is completely formed there is a notch in the outer lip, at the more distant part from the spire: very rarely, indeed, have we met with an instance in which the whole of these perforations have been closed by the animal, (probably on account of disorder,) and in those instances it is very evident that they have existed, so that these perforations may be regarded as a certain distinguishing mark between *Haliotis* and all other genera. The columellar lip is generally flattish and much lengthened; sometimes a very strongly marked orbicular muscular impression nearly in the center of the inside is observable, and we believe the interior is always pearly and variegated with brilliant colours.

This Genus as its name implies is marine; about thirty species are known at present, most of which are very ornamental shells, and some are exceedingly scarce; the commonest of all, which may be looked upon as the type of the Genus, is the *H. tuberculata*, which is very abundant on the coasts of Guernsey and Jersey, where the animal is eaten, and the shells are frequently arranged in quincunx order, exposing their brilliant and variegated interior to the rays of the sun as ornaments on the outsides of the houses. We do not think this shell can with propriety be considered a native of our own coasts, though the dead shells are sometimes thrown up on our southern shores after violent storms. The existence of fossil species is very doubtful; the only approach to it that we have ever seen were some incrustations taken up from the sea near the Cape of Good Hope.

Fig. 1. *Haliotis excavata*, Lam.

2. ——— *Asinina*, Auct.

3. ——— *parva*, Linn. *canaliculata*, Lam. *carinata*, Swainson. This is one of two shells that have been confounded under the Linnean specific name *parva*, but we think it quite proper to retain that name, because the other has been well designated by the specific name of *Scalaris*, by Leach, which is equally good, whether it be called *Padollus* or *Haliotis*.



## PETRICOLA.



*Lam.* Hist. Nat. des Anim. sans vert. V. 503.



**TESTA** æquivalvis, inæquilatera, transversa, subtrigona, vel oblonga, latere postico rotundato, antico plus minusve attenuato, plerumque paulum hiant. *Cardo*, dentibus duobus in utrâque valvâ, interdum acutis, recurvis; interdum brevibus, obtusis. *Impressiones musculares* duæ, *antica* plerumque rotundata, *postica* oblonga. *Sinus* impressionis pallii adhærentis musculi magnus. *Ligamentum* externum.



THE Genus *Petricola*, as it stands at present, is composed of several shells which Lamarck formerly thought sufficiently different to form two genera, his *Petricola* and *Rupellaria*, the first with two cardinal teeth in one valve and one in the other, the second with two teeth in each valve; but we entirely agree with him in the propriety of uniting them, not only because they appear to be subject to variation in the number of teeth, but because the specimens existing in cabinets are very seldom perfect, and do not consequently exhibit the same number of teeth as exist in nature. But we certainly cannot profess to be so well satisfied with the place Lamarck has assigned to this and some other genera which form the hollows in stone in which they dwell; we think that a great degree of similarity, in external figure and appearance as well as habit, should have brought them nearer to the *Pholadarice*.

## PETRICOLA.

Shell equivalve, inequilateral, transverse, generally rather triangular, but sometimes transversely elongated and even subquadrate; the posterior side rounded; the anterior side also rounded, generally more or less attenuated, and for the most part rather gaping. Two cardinal teeth in each valve, which are sometimes acute and recurved, particularly the posterior tooth in one valve, and the anterior in the other; sometimes also the teeth are internally grooved, and the anterior one in one valve is broad and bifid; sometimes the teeth are short and obtuse. The muscular impressions are two; that on the anterior side suborbicular, the posterior rather oblong, and there is a large sinus in the impression of the muscle by which the mantle adheres to the shell. The ligament is external, but it is sometimes almost hidden by the prominent anterior edge of the valves near the umbones.

The Petricolæ are marine; they live in cavities, evidently of their own working, though on account of their form they cannot possibly have been produced by a rotatory motion, for they are exactly of the shape of the shell itself, and a very little larger. Several species have the same form and are externally rough like the *Pholades*, others are more irregular and approach nearer to the *Saxicavæ* and *Venerirupes*; to what Linnean Genus they belong it is difficult to say: such species as have been described by Linneans have been placed in *Venus* and *Donax*. We have represented the following species in our plate, two of which being hitherto undescribed, we have added the specific characters:

- Fig. 1. *Petricola pholadiformis*, Lam. Outside.  
 2. ———— Inside of both valves.  
 3. ———— *Dactylus*, Nob. Testâ transversim oblongâ subgibbâ; latere postico brevior, sulcis longitudinalibus, striis incrementi decussatis, radiato; antico subglabro.  
 4. ———— *ochroleuca*, Lam.  
 5. ———— *rupestris*. *Venus rupestris*, Brocchi.  
 6. ———— *subglobosa*, Nob. Testâ subglobosâ, latere postico rotundato, antico subtruncato; costulis longitudinalibus, decussatis, anticè distantioribus, altioribus.

## TEREBRATULA.



TESTA inæquivalvis, æquilatera, ovalis vel subtrigona, pediculo brevi, tendineoque affixa; valvæ alterius umbo productus, sæpe incurvus, apice perforato aut emarginato; *cardo* dente in utroque latere unico; valva altera processibus duobus testaceis, gracilibus, plerumque furcatis, variè flexuosis, e cardine nascentibus internè instructa. *Impressiones musculares* in valvâ perforatâ duæ (interdum sed rariùs distinctæ,) oblongæ, centrales, approximatae; duæ itidem in alterâ rotundato-subtrigonæ, subcentrales, distantiores.



THE principal and most numerous Genus of Lamarck's family of Brachiopoda, all of which are furnished with two shelly valves, attached to rocks and submarine bodies either by a byssus or tendinous pedicle, or by the outside of one of the valves, and remarkable for two long opposite fringed arms, that are rolled up into a spiral form when at rest. To this family belong not only the *Orbicula*, *Terebratula* and *Lingula*, which Lamarck includes in it, but also his *Crania* and *Calceola*, Sowerby's *Spirifer*, Defrance's *Thecidea*, and *Hipponyx*, which we are surprised to find still arranged by Lamarck among his *Calyptraciens* under the singular appellation of "*Cabochons* (Pileopsis) *ayant un support connu*;" we thought we had sufficiently demonstrated the impropriety of this, but in order to show it more clearly we have only to observe that Lamarck's *Calyptraciens* are *Gasteropodes*, that the shell being a testaceous deposition from the mantle, and the *Gasteropodes*, not being furnished with such a mantle under their foot,

## TEREBRATULA.

could not possibly deposit testaceous matter in such a position as to form what he has thus termed a "support," but which should more properly be called another valve; consequently, his "*Cabochons ayant un support connu*" should be placed among the Conchifera, or we must suppose the absurdity of a *Gasteropoda* depositing shelly matter from the lower part of its foot, where it is not furnished with the necessary organs.

The Terebratulæ are placed by Linné among the Anomiæ; they are, however, very easily distinguished, and have, therefore, been long separated from them: they form a Genus of primary importance to the Geologist, because they are found in a fossil state in all the secondary and tertiary beds, beginning with the very oldest, from which circumstance Lamarck concludes that they have inhabited the depths of the ocean, and consequently that they are generally pelagic shells. There are a great number of species, both recent and fossil, but particularly of the latter; these might perhaps be advantageously divided into several genera, though we believe if any attempt at such a division were made, it would be extremely difficult to assign to each Genus its proper limits. We shall, therefore, be contented with pointing out the characters of the Genus, and those peculiarities by which it is distinguished from other genera that have been confounded with it, or that are nearly related to it.

Shell inequivalve, equilateral, very variable in general form, being sometimes nearly egg-shaped, sometimes very flat, particularly when in a young state, but generally rather triangular and gibbous, attached to submarine rocks, stones, &c. by a short tendinous peduncle formed of numerous closely united fibres, which, however, separate a little at the attached end. The umbo of one valve, which may properly be called the upper valve, is more or less produced, frequently incurved, perforated at its apex, or notched at its inner edge, with a small curved tooth on each side of its hinge, which fits into a corresponding hollow in the other valve, in such a manner that the two valves cannot be separated without breaking either these teeth or the edges of their sockets. The inside of the other valve is furnished with two slender shelly processes (generally called cartilages, but really of

## TEREBRATULA.

the same substance as the shell), which are sometimes short, simple, and recurved, but sometimes of considerable length, branched and variously bent, and generally anastomosing: these generally commence on each side of the hinge, but sometimes near the centre of the shell, and they are sometimes united to the shell at other points. What purpose these appendages answer we cannot pretend to say; Lamarck thinks they are supports to the animal within. Muscular impressions, two in each valve, sometimes very strong, but mostly very indistinct; those in the perforated valve oblong, central and close together; those in the other valve rather triangular, with rounded angles, nearly central, but rather more distant.

Terebratula is distinguished from Anomia by its regularity, its produced beak, its being attached by means of a fibrous pedicle, and its internal appendages: it will not be confounded with Crania, Thecidea, or Hipponyx, because they are all attached by the outside of the shell: the very peculiar though regular form of Calceola will prevent its being mistaken for that. Orbicula and Lingula have no hinge teeth, which circumstance is a sufficiently discriminating mark.

The recent species of this Genus are found attached to stones and to each other in the ocean, in all climates; but only two or three species are found on our own coasts. They are not, in general, remarkable for the brilliancy of their tints, though a few of them are very prettily coloured; but they are mostly of a dull horn colour. Many of them are variously and longitudinally striated and grooved; and dentated at their edges; some are remarkable for a deeply emarginate superior edge to one valve, and a corresponding prominent edge to the other: others, again, have one side entirely depressed, and the other elevated; and many are very smooth on the outside, as well as somewhat hyaline. They are rather highly valued by collectors, especially when highly coloured.

The fossil species are much more numerous than the recent; they occur in all the secondary and tertiary formations, except those of fresh water origin, and we never met with any of them in the "*upper marine formation*." Particular species are peculiar to certain beds, which,

## TEREBRATULA.

however, it is not the object of our work to particularize; we shall therefore conclude, by enumerating the examples we have given in our plate.

Fig. 1. *Terebratula sanguinea*? Dillwyn, but certainly not *T. sanguinea* of Leach.

2. ——— *caput serpentis*, Lam.
3. ——— *dorsata*? Lam. showing the internal appendages.
4. ——— *rosea*, Mawe. Also showing the internal appendage and the muscular impressions in one valve.
5. ——— *psittacea*. Showing the internal appendage and the muscular impressions of both valves. Another specimen closed shows the outside.



## DENTALIUM.



**TUBUS** testaceus, regularis, leviter arcuatus; versus extremitatem posticam sensim attenuatus, interdum fissurâ superiùs et appendiculis duobus utroque latere posticè instructus; utrâque extremitate pervius.



WE are aware that we shall incur the displeasure of some of our rigidly scientific friends, by introducing the Genus *Dentalium* in our work on the Genera of Shells, for the same reason as some complaints have already been instituted against us for admitting the *Galeolaria*, that is, because the animal which inhabits it does not belong to the same class as the greater number of testacea; but assured as we are that a right knowledge, and consequently a natural classification of shells, will never be attained but by the study of the animals, we still think ourselves justified in presenting such genera to our readers, because, whatever may be the nature of their animals, we are engaged to give an account of the shells alone, and the *Dentalia* are as decidedly shells as any others. We may further add, that so little is known at present upon the subject, that it is not without evident doubt that Lamarck has placed it among his *Annelides*.

The *Dentalia* are regular, slightly arched, generally smooth, sometimes longitudinally grooved or striated, and sometimes transversely and annularly striated, shelly tubes, open at both extremities and sensibly smaller at the posterior. Many of the species appear to be entire at the smaller end, but we have not unfrequently observed in others a more or less elongated longitudinal fissure, commencing at the upper part of this posterior aperture,



## DENTALIUM.

and sometimes extending considerably along the superior part of the tube, and from this circumstance Lamarck has named one species *D. Fissura*. Besides this fissure, these species, when perfect, have a small semicircular appendage projecting posteriorly from each side of the aperture: these do not appear to have been observed before; we have, therefore, given a magnified representation of the posterior extremity of *D. Fissura*, which shows them more distinctly than any other species we have seen.

There are many recent species of Dentalium, some of which are much more nearly cylindrical than others; some are ventricose, others have a slight constriction near, or at the anterior aperture: they are all marine, and several are found on our coasts. Of fossil species there are also many, particularly in the marine beds of the tertiary formations; the London Clay and the Calcaire grossière swarm with several sorts not easily distinguishable from the recent species, among which, we may particularly remark the fossil species from Piacenza, which so nearly resembles *D. elephantinum*, that Brocchi has not hesitated to refer it to that species, and the Eburneum of Lamarck, which he says inhabits India, and is found fossil at Grignon.

In our plate we have given

- Fig. 1. *D. elephantinum*, Lam. Recent.  
2. The same fossil, according to Lam. and Brocchi.  
3. *D. Fissura*, Lam.  
4. A magnified portion of the posterior extremity.  
5. *D. circinatum*.  
6. *D. eburneum*.  
7. *D. Gadus*.  
8. The same magnified.

9. We do not venture to assert that these also are *Dentalia*, but we have given a drawing of them in our plate, because of their great simliarity in form; they are of a corneous, not a shelly substance, closed at the larger end and attached to each other by a similarly corneous ligament; what they are we do not even dare to guess; for we are constrained to acknowledge that, in our opinion, scarcely any subject is involved in more impenetrable obscurity than the real nature of the Dentalium, on account of our not being acquainted with its animal inhabitant.

## DOLABELLA.



*Cuvier.* Ann. du Mus.—Regne Anim.



**TESTA** oblonga, subarcuata, dolabriformis, epidermide corneâ induta: posticè angustata, crassior, callosa, subspiralis; anticè planulata, latior et tenuior: marginibus posticis reflexis.



A GENUS instituted by Lamarck, in his *Système des animaux sans vertèbres*, published in 1801; from an acquaintance with the shell only; the animal of which has, however, since been the subject of a particular memoir, published in the “*Annales du Museum*,” by the celebrated Cuvier: from his examination, it appears that the internal structure of the animal is exactly like that of *Aplysia*, to which Genus, indeed, it seems so nearly related in most particulars, that if it had not been for the peculiar character of the posterior extremity of the animal of the *Dolabella*, and the decidedly calcareous nature of its shell, we should have hesitated about the propriety of their being considered as separate genera. Some idea of the general external characters of the animal may be formed from the following description which we have translated from Lamarck’s “*Hist. nat. des. anim. sans vert.*” VI. pt. 2, p. 40: “An oblong, repent body, narrow in front, and broader behind, where it is obliquely truncated by an inclined orbicular plane, having the edges of its mantle reflected and pressed down upon the back. Four rather tubular tentacula arranged in pairs. Operculum of the branchiæ, including a shell, covered by the mantle, and placed near the posterior part of the body.”

## DOLABELLA.

Shell rather oblong, somewhat arched and hatchet-shaped; narrow, thick, callous and subspiral at the posterior extremity; increasing in width, and becoming flatter and thinner towards the front: the shell is almost entirely covered with a strong, horny, yellowish epidermis, over which the posterior edges of the shell are reflected.

Several recent species of this Genus are known, which, we believe, are all included under the Linnean name *Bulla dubia*, but which, upon comparison, will be easily distinguished from each other; the one of which we have shown both sides agrees with Lamarck's description of *D. Rumphii*; we have another lying before us, in which the posterior callosity is much more expanded and thinner; and the disk is obliquely grooved, which appears to be a very distinct species. The Dolabellæ are inhabitants of the Indian Ocean, they appear to prefer quiet situations, where they cover themselves thinly with mud.

Not known in a fossil state.

## NERITA.



**TESTA** solida, crassiuscula, semi-globosa, subtus planiuscula, spirâ brevi, umbilico nullo. Aper-tura semi-orbicularis, integra, labio interno planulato septiformi, acuto, sæpius dentato; labio externo internè plerumque dentato vel crenulato. Operculum (*testaceum*) appendicu-latum.



WHILE the advantages resulting to the scientific concho-logical students from the improved classification of modern authors is every day more and more highly appreciated, we are sure we shall not incur the displeasure of our readers for presenting to them the Genus *Nerita*, separated from *Neritina* and *Natica*. Notwithstanding there are those who still think that *Nerita* and *Neritina* form together but one natural Genus, because, forsooth, they do not find any material diversity in the general structure of their ani-mals, and who tell us that difference in habit, or the circumstance of their dwelling in fresh water or in the sea, or on dry land, are not to be taken into consideration and do not constitute real differences, because they know that certain species of *Mytili* and Lamarckian *Arcaceæ* are found inhabiting fresh water; we, for ourselves, cannot avoid again expressing our conviction, that where essential differences in the shell only, independantly of the animal, do exist, in combination with diversity of economy and habit, and where many species manifest the same peculiarities, there is good and sufficient reason for regarding them as distinct genera; wherefore, we do not hesitate to avow our conviction that *Nerita* is properly separated from *Neritina*.

Shell semiglobular or obovate, solid, generally thick, in which peculiarity it differs from *Neritina*, as well as in

## NERITA.

having a thin epidermis; mostly flattish beneath, without any umbilicus; spire very short. Aperture semicircular; inner lip mostly flattened, rather sharp edged, most commonly toothed, its edge oblique to the axis of the shell; outer lip sharp edged, crenulated or toothed on the inner side. A little prominence is observable just within the shell at the lower end of the inner lip, between which and the inner lip the little appendage to the operculum slides as it opens, or closes the aperture for the ingress or egress of the animal; and it is remarkable that this operculum opens as a door upon its hinges for the animal to pass out: Lamarck says it is sometimes shelly, sometimes only horny; all that we have seen are shelly.

The shells here included under *Nerita* form only a part of that Genus according to Linneans; there are many recent species which are marine, but as we cannot include the one commonly called *N. littoralis*, we do not know of any British ones, and though we are acquainted with several fossil species, they are rare, and as we believe only occur in the London Clay and corresponding formations.

The little shell commonly found in the Stonesfield slate, and referred to this Genus, should, as we think, go with *N. littoralis*; and probably our present fig. 5, with *Turbo littoreus*, from which they only differ specifically.

Fig. 1. *Nerita Peloronta* with its operculum.

2. The inside of the operculum.

3. *Nerita chlorostoma*? Lam.

4. We believe to be undescribed and have therefore called it *N. ornata*, testâ subglobosâ, transversim sulcatâ, albo vel luteo-nigroque variegatâ, spirâ prominulâ; labio interno quadridentato, supernè rugoso.\*

5. *Nerita granulata*, DeFr.

6. ——— tricarinata, ———, a fossil species from Hauteville in Normandy.

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\* We once thought this was the *N. Histrio* of Linn., but the descriptions of that species are so variable, and the figures cited so bad, that it is impossible to ascertain it with certainty.

## NATICA.



**TESTA** subglobosa, vel obovalis, spirâ brevi. *Apertura* integra, semi-orbicularis, labio columellari obliquo, edentulo, calloso. *Umbilicus* plerumque callo spirali instructus, callo umbilicum interdum penitus obtegente, interdum obsoleto. Labium externum acutum, internè lævigatum. *Operculum* testaceum vel corneum.

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**SHELL** subglobose, oval or oblong, with a short, sometimes very short, and rarely pointed, spire: aperture semi-circular, large, very seldom effuse; columellar lip oblique, without teeth, generally thickened, sometimes spread thickly over the umbilicus. Umbilicus generally large, furnished within with a spiral callosity which sometimes increases so as to cover the umbilicus, and is sometimes very small, and in a few instances scarcely to be perceived at all. Outer lip sharp edged, smooth within. Operculum horny in some species, shelly in others.

Such are the characters by which the *Naticæ* are to be distinguished: they form a rather numerous Genus, dissevered from the Linnean *Neritæ* by Bruguière; we fear, from the ambiguity necessarily observable in the description, that too many shells are included in it, and that it might have been better, according to the suggestion of Lamarck, to have united some of his fossil *Ampullariæ* with some other shells that have usually been combined with *Nerita* and *Natica* under a new generic appellation. The Genus so formed would consist of those shells which are decidedly marine, like *Natica*, but which have no callosity in the umbilicus, and in that respect resemble *Ampullaria*. How far it is proper to combine



## NATICA.

such shells as have a horny with such as have a shelly operculum, we think also a question of some importance; nor can we ascertain whether all those *Naticæ*, which have a callosity in the umbilicus have also a shelly operculum or not, nor whether all those which have an horny operculum are also destitute of the callosity in the umbilicus. The difficulty of ascertaining this point is the consequence of the general carelessness of those who have opportunities, and have not preserved these shells with their opercula.

Of the numerous recent species which we now admit into *Natica*, a very few inhabit our coasts, and these all have horny opercula: we certainly have not the *N. Canrena*, nor the *N. Glaucina* of Lam., although both those names are frequently admitted into English catalogues, and Lamarck does not appear to have been acquainted with our more common species. The fossil species are also numerous, and they are remarkable for their near resemblance in form to the recent; some of them even retain their colours: they abound in some of the newer formations above the chalk, especially in the London Clay, Calcaire grossière, and Craig. We should not hesitate to admit to this Genus as it now stands several shells which Lamarck places among his *Ampullaria*, such as the following species; *A. acuta*, *spirata*, *canalifera*, *patula*, *sigaretina*, and probably *A. crassatina*, *hybrida*, *acuminata* and *depressa*. His fossil *Natica labellata*, and our recent *N. glaucinoides* resemble each other extremely.

Fig. 1. *Nerita Canrena*, with its semicircularly grooved shelly operculum.

2. ——— Mammilla.

3. ——— *cepacea*, Lam., a fossil species from near Paris.

4. ——— *Canrena* of Brocchi, a fossil from Piacenza.



## UNIO.



*Lam.*



TESTA æquivalvis, inæquilatera, transversa, epidermide olivaceâ induta. *Impressiones musculares* duæ, postica composita. *Dentes, cardinalis* unicus, brevis, irregularis, simplex aut bipartitus, substriatus; *laterales* duo, elongati, compressi, anticè producti, nonnunquam obsoleti. *Ligamentum* externum.

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A GENUS of fresh water shells placed among the Myæ by Linné, but nevertheless well discriminated by its peculiar characters; and, perhaps, forming one of the most natural genera, intermediate, as we believe, between the Lamarckian Anodonta (Anodon) and Hyria; which latter may, we think, be very properly disunited from it as forming a well characterized Genus, distinguished from Unio by its linear posterior teeth, and its *two* wings. We are compelled, however, to unite Lamarck's *Castalia* to *Unio*, not indeed without offering the tribute of our deserved commendation to that great Conchologist, for his discrimination in placing this latter Genus between his *Trigoniæ* and his *Naiades*: for we cannot suppose that he considers the *Trigoniæ* as at all connected with the *Arcaceæ*, much less with the *Nucula*, whose ligament is internal; next to which, however, we find it placed.

The Uniones are mostly transverse, sometimes almost cordate, and even suborbicular, inequilateral, equivalve, mostly thick, sometimes extraordinarily so, though in some few instances rather thin shells; generally covered

## UNIO.

with a more or less dark-coloured olivaceous epidermis, which is in almost all cases eroded or eaten away from the umbones, and the more prominent parts of the shells; a character which it possesses in common with all fresh water bivalves. The substance of the shell is highly brilliant and of a pearly lustre. Hinge tooth short and irregular, simple or double, sometimes more or less divided and striated; in the species which Lamarck calls *Castalia ambigua*, it is slightly elongated and more regularly striated than in most others, but it is far from being regularly subtrilamellar. This hinge tooth which is very irregular and thick, in those species whose shell is thick; more regular and less clumsy in the thinner species, appears to be the only constant character by which Unio is to be distinguished from Anodon; for although, as its name implies, that Genus is wholly destitute of teeth, yet there are some shells which evidently combine all the other characters of both genera: and further, the two anterior, produced or elongated, and compressed lateral laminae or teeth, which usually characterize Unio, are sometimes very indistinct, sometimes entirely obsolete; and also subject to the variation above described, according to the degree of thickness in the respective species. Muscular impressions two in each valve, the posterior one compound. Ligament external, more or less elongated according to the transverse length of the shell.

This is a Genus of fresh water shells, which appears to be very numerous, and whose species are exceedingly difficult to determine, because subject to so much variation. Lamarck describes forty-eight species, of which several are British, of these the *margaritifera* is the most celebrated; it sometimes affords pearls of considerable value even in our rivers: it is difficult to say, whether the *pictorum* of Lamarck, and the *ovalis* of Montagu, are the same species; the latter, and the *U. Batavus*, are common. Of the species which inhabit the rivers of warm climates, many are remarkable for the beauty of their internal colouring, their pearly lustre, and the great thickness of their shell; the rarer species are very highly valued.

There are many fossil shells, particularly in the coal measures, which are referred to this Genus, and we think correctly so, because, though we have never been able to

## UNIO.

consult the characters of the hinge, yet judging from the cast of the inside which is very common, we find no difference between it and casts that we have made from the inside of recent *Uniones*, but we do not feel ourselves authorized to pronounce the shell published in Min. Con. t. 153. (*U. crassissimus*) to be an *Unio*; for its hinge is far from being characteristic, and it has not the compound posterior muscular impression of that Genus; it agrees more nearly with some of the Lamarckian *Cypricardiæ*: at the same time, we must confess our doubts about the probability of that Genus being ultimately adopted; our individual knowledge of it is too imperfect to support any opinion that we may hitherto have formed upon the subject; of one thing we are, however, certain that some of the shells referred by Lamarck to *Cypricardia*, are decidedly species of our *Astarte*, his *Crassina*. Our attention is drawn in the next place to *Unio Listeri*, *hybridus*, *concinus* and others, figured in "Mineral Conchology," and placed in the Oolitic series by Conybeare and Phillips; and here, in confirmation of some observations we find recorded in Conybeare and Phillips's "Outlines of the Geology of England and Wales," we have to remark that these, along with *U. crassiusculus*, Min. Con. t. 185, from the Crag, all want some of the principal distinguishing marks of the *Unio*, and judging even from their hinges, we should certainly hesitate to place them with *Unio*. We have never seen any perfect specimen of the shell published as *Unio*, from the fresh water formation; but if we may be allowed to decide from such fragments as we have examined, and from its geological position, we should hardly feel a doubt upon the subject. Notwithstanding, however, what has been advanced above, we must still consider the existence either of *Uniones* or *Anodontes*, in any bed below the Chalk, except the Coal measures, as exceedingly problematical.

In our plates we have represented, as characteristic of this Genus, and as specimens of the variety of forms of several species.

Fig. 1. The *Unio ovalis*, *Mya ovalis*, *Mont.* but united to *Unio pictorum*, by Lamarck.

2. *Unio ambiguus*, *Nobis*. *Castalia ambigua*, *Lam.* We have lately been so fortunate as to possess several specimens of this rare and valuable shell, for which Lamarck only cites the collection of the Marquis de Drée.

## UNIO.

3. *Unio glabratus*? Lam. a shell which agrees with Lamarck's description as far as it goes, but he does not mention the fact, that in his shell the anterior tooth or lamina is almost obsolete, which is the case in ours.

4. *Unio brevis*? Lam.

5. *Unio alatus*, Lam. this is a remarkable species, because it seems to form a link connecting *Unio* with *Hyria*; from which, however, it is evidently distinct, as it has only the anterior wing, and its cardinal teeth are not in the least elongated.

## CONUS.



**TESTA** turbinata, seu inversè conica, rariùs subventricosa, convoluta, *spirá* plerumque brevissimâ. *Apertura* longitudinalis, angustata, edentula, basi subeffusa, labio externo plerumque supernè emarginato.



WHATEVER dismemberments the greater number of the Linnean genera have been subjected to, *Conus* has always remained entire; the reason of this appears to be that the general form of the shells included in it, is subject to but slight variation; so that though it is one of the most numerous genera, it has usually been divided only into two families, the coronated and those which have no coronet. The variations, however, in general form, to which this Genus is liable, are such, that without great precaution, several other genera may be confounded with it, such as *Strombus*, and sometimes, though rarely, *Cypræa*, in a young state; and its affinity to some *Pleurotomæ* is so near, that there exist some species which cannot, without difficulty, be placed in their respective genera. We think, moreover, that the Genus might be advantageously divided into more numerous families, and that a further division would be desirable to the student on account of the number of species. Those with a comparatively elongated spire, for instance, might be well placed together; for though the spire of the Cones can never be properly said to be elongated, still there are some whose spire is equal in length to one-third of the whole shell: those whose spire is very short might, perhaps, with equal propriety, constitute a family: some again which are rather ventricose, like *C. bullatus*, *Aulicus*, *Geographus*, *Tulipa*, &c. might be divided into two families, the ventricose coronated, and the ventricose without a coronet. Still

## CONUS.

more numerous divisions might much facilitate the examination of species. We have not met with any author who mentions the notch in the upper extremity of the outer lip so common to Cones, and on which account it is sometimes so difficult to distinguish the species from *Pleurotomæ*; neither are we quite satisfied that the animal inhabitant of the Cones, is furnished with an operculum: for Lamarck appears only to give it one on the authority of Adanson's figure, and collectors have never taken the pains to preserve these animals, common as they are, in spirits. We have, however, one reason for believing them to have an operculum: it is, that close to the upper extremity of the linear aperture, and on the body whorl there is generally a small indentation, which has the appearance of having been produced by the attrition of some hard substance frequently passing in and out of the aperture; and which, moreover, is never covered with epidermis.

In general shape the Cones, as their name imports, may be described as inversely conical, turbinate, sometimes, though seldom, rather ventricose convolute shells, whose spire is generally very short, though in a few species rather elongated. The longitudinal aperture is, in most instances, as long as the shell, generally narrow, spreading a little towards the base where it is rather effuse. The outer lip is mostly very straight, seldom a little arched, and always without teeth; nor are there ever any teeth on the Columella: the superior extremity of this external lip is very commonly emarginate, or notched close to the last volution. We believe the Cones are always covered with a more or less thick epidermis when living; but as very little interest has hitherto been attached to these or any other shells, except on account of their beauty, when deprived of their natural characters, we are not, indeed, surprised that this unsightly covering should generally have disappeared, before they find a place in the drawers of collectors: yet, as we ourselves are admirers of nature in her own garb and unadorned by art, we must be allowed to regret, that the practice of what is commonly termed shell cleaning, should be so very general. That the brilliancy of their colours is enhanced by this practice we readily admit, but their real characters are too often lost by this artificial



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polish, and the shells thus divested of their natural appearance, must be considered in a scientific point of view, as imperfect. If the persons employed to collect shells, were aware how much the value of those which have their epidermis is increased by retaining it, they would gladly bring into the market a due proportion of unsophisticated specimens. Our love of science would be thus satisfied, and we should unreluctantly confess, that no Genus of Shells, when cleaned, can boast of more beauty, or of more splendour and variety of colouring, than that under our consideration: for this reason, and in consequence of their great rarity some of them are very highly estimated; of these, the *Gloria maris*, the *Omaicus*, the *Aurisiacus*, the *Cedo-nulli*, and a few others, may be considered as the most valuable.

Fossil cones are not unfrequent; but, we believe, that they occur only in the newer strata, or those above the chalk, such as the London Clay and Crag in England, the *Calcaire grossière* in France, and the contemporaneous beds in other countries: there are a few seen in collections, filled with a coarse dark green arenaceous substance; these belong to the *Terrains calcareo-trapéens* of Brongniart. Doubtful casts are met with in the inferior *Oolite*, according to Conybeare and Phillips.

There is a circumstance relating to the animal which we think worth mentioning, it is its habit of absorbing the testaceous matter from the outside of the inner concealed volutions, so that when a section of a cone is made, the inner portions of shell remain exceedingly thin, while the outer or exposed parts are comparatively thick and strong. The animals of many other marine shells have the same habit, but we are inclined to think only those which have an operculum.

The Cones, as we have already observed, may be confounded with the *Pleurotomæ*, and the young specimens of some *Strombi*, and those cones which are rather ventricose with young *Cyprææ*, but they may be distinguished in the following manner: from the *Pleurotomæ*, by their short spire, their linear aperture, and their straight columella; from the young *Strombi*, by their being entirely destitute of varicose sutures, and by their never having any appearance of a notch near the lower extremity of the outer lip; the young *Strombi*, moreover,



## CONUS.

are seldom, if ever, so regularly conical: from the young Cyprææ, by the thickness of their shell, the coronated or abrupt spire, by their not being polished in every part, which the Cyprææ always are, because the mantle of their inhabitant deposits testaceous matter over the whole shell, and because they never have an epidermis.

In order to show the various shapes of the different divisions of Cones, we were obliged to give them in two plates, the species we have represented are,

Fig. 1. *Conus antediluvianus*, a fossil species from Piacenza, whose spire is coronated and more acute than any other species with which we are acquainted

2. *Conus grandis* with its epidermis.

3. ——— *nobilis*.

4. ——— *australis*.\*

5. ——— an hitherto undescribed species, it is very elegantly shaped and beautifully marked; it is now in the cabinet of the Rev. Dr. Goodall. We have named it *C. duplicatus*, the following are its characters: *C. gracilis*, subventricosus, spirâ breviusculâ acutâ; anfractu ultimo supernè rotundato, lineis transversis duplicatis impresso: testa alba, maculis, strigisque fulvis ornata.

6. *Conus Terebra*.

7. ——— *Nussatella*.

8. ——— *Dormitor*, a fossil from Barton, approaching very nearly to a *Pleurotoma*.

9. *Conus bullatus*, two views.

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\* In the plate this is called *C. gracilis*; but upon examination we find that it accords with *C. australis*, Lam.

## HYRIA.

Lam. Hist. Nat. des Anim. sans vert. VI. pt. 1. p. 81.

**TESTA** æquivalvis, inæquilatera, transversa, obliquè subtrigona, utrinque auriculata, basi truncata, recta; epidermide olivaceâ induta. *Impressiones musculares* duæ, postica composita. *Cardo* dentibus duobus elongatis; *dens posticus* seu *cardinalis*, multipartitus, parte externa majore lamellari, partibus internis minoribus; *anticus* seu *lateralis*, lamellaris, prælongus, in alterâ valvâ bipartitus. *Ligamentum* externum lineare.

WE have adopted Lamarck's Genus Hyria, because, though we find upon examination, that it possesses many characters in common with Unio, yet we think the two genera are sufficiently distinguished by the elongated lamellar posterior teeth and the two wings of Hyria. Their general form, however, cannot be considered as a good distinguishing character, for we are acquainted both with Anodontes and Uniones, which approach the Hyria very nearly in that particular. These are fresh water shells whose habits approach very nearly to each other, and which form a very natural family with Anodon, Iridina, and Galatea of Lamarck, (Potamophila of our work, and Megadesma\* of Bowdich;) and this latter Genus

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\* We imagine this name must be adopted, because both Galatea and Potamophila were previously occupied.

## HYRIA.

seems to us, to be the link which connects the others with Lamarck's *Conques fluviatiles*.

The Hyriæ are equivalve, inequilateral, transverse, obliquely subtriangular shells, with two wings; in their general form, they consequently very nearly resemble the *Aviculæ*, but they are generally more gibbose, and their two lateral muscular impressions, of which the posterior one is compound, will also distinguish them from *Avicula*, without taking into consideration the characters of the hinges. The base according to Lamarck, or the hinge line according to Swainson is elongated, and generally very straight. Hinge with two elongated teeth in each valve, the posterior of which is divided irregularly into several parts, and of these the internal are the smaller, and the external larger and lamellar, and forming two lamellar portions in one valve; the anterior or lateral tooth much more lengthened, lamellar, and bipartite in the other valve. The teeth are rough and irregularly striated. Muscular impression of the mantle entire. Ligament external, linear. A dark olivaceous coloured epidermis covers the outside wherever it has not been eroded, which has generally been the case with the more prominent parts of the shells.

We are at present acquainted with only four species of Hyria; *H. avicularis*, *Lam.* (*Mya syrmatophora*, *Linn.*) *H. corrugata*, *Lam.* *H. elongata*, *Swains.* and another in our own collection; all these are recent from the rivers of warm climates. We have never seen any fossil species.

## CALCEOLA.



*Lam.* Anim. sans vert.



**TESTA** æquilatera, inæquivalvis, triangularis, subtus complanata. *Valva* major cucullata, ad aperturam obliquè truncata, margine cardinali transversim recto, medio emarginato, subdentato; margine superiore arcuato. *Valva* minor planulata, semiorbicularis, operculum simulans; margine cardinali tuberculis duobus lateralibus, foveâ medianâ et lamellâ instructo.



ONE of the many singular shells placed by Linné among his Anomiæ, to some others of which we still think it nearly related; notwithstanding an opinion which we have heard expressed, that it belongs to the *Polypiers*; an opinion undoubtedly formed from the consideration of its structure, which must be allowed in some respects to resemble some of them, but this structure is also to be discovered in several other Lamarckian *Brachiopodes*, as well as in some of his *Rudistes*, a family upon which we have already expressed our opinion. With respect to the *Calceola*, we think that it properly belongs to the *Brachiopodes*, that it is related to the *Spiriferi* of Sowerby, and approaches some of the *Terebratulæ*; but Lamarck, however, places it with his *Rudistes*.

Shell equilateral, inequivalve, triangular, with a flattish triangular area *beneath*, by which we suppose it to have been attached, and the point of which forms the beak or umbo of the larger valve: this area is irregularly and transversely striated. Large valve obliquely truncated at the upper side, cardinal margin transversely straight, notched, and somewhat dentated in the center;

## CALCEOLA.

upper edge arched. It is in this large valve, that the fibrous or rather interruptedly porous structure, which has given rise to the opinion of its belonging to the *Polyparia*, is generally observable. The upper or smaller valve is flattish, semiorbicular; it has the appearance of an operculum to the large hollow valve, and is semicircularly striated; its internal cardinal edge is furnished according to Lamarck, for we have never seen it, with two lateral tubercles, a central pit, and a small plate.

The *Calceola* is distinguished from all other bivalves, by its form, something like a ladies slipper, without a heel, by its thickness and solidity, by its being striated internally from the center to the circumference, and by having no ligament. It is a fossil; found, as we are informed, in the environs of Juliers; and, as we suppose, in the Mountain Limestone: its nearest analogues are some Mountain Limestone fossils, represented in "Martin's Petrif. Derbiens, under the name of *Anomia cuspidata*; and in Sowerby's Mineral Conchology, under that of *Spirifer cuspidatus*; which, however, can hardly be confounded with it, as its characters are sufficiently distinct.

The *Calceola* is supposed to have been marine: only one species is known, the *Calceola Juliensis*\*, of this we have given three views in our plate.

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\* *Anomia Sandalium*, Linn.; *Calceola sandalina*, Lam.; in our plate it is called *C. Sandalium*, but we prefer the above name.

## CYPRÆA.



**TESTA** ovata, vel ovato-oblonga, ventricosa; *apertura* longitudinalis, angustata, utrinque dentata, extremitatibus utrinque breviter canaliciferis, subeffusis. *Spira* brevis, obtectæ.



THE Cowries are perhaps equal, at least they do not yield in point of beauty to the Cones and Volutes; but as there is not a great number of rare species they are not so highly valued: there is, however, one circumstance connected with their general history which renders them one of the most interesting of all genera, and which circumstance does not appear to have been satisfactorily accounted for; we advert to the fact, that young Cowries which have formed their involute outer lip are generally larger than when they are full grown and have completed their shell. It is to be regretted that Bruguière should have been prevented by a premature death from publishing the evidence he possessed, that the animal of the *Cypræa*, before it arrived at its complete growth, abandons its shell several times, to form another more fitted to its dimensions. Our own opinion upon the subject is, that the animal may have the power of absorbing the calcareous matter, and redepositing it of a form and size more congenial to its own increased or decreased bulk: and this opinion does not appear to us at all inconsistent with Bruguières idea of the shell being always formed at two distinct periods, though we confess that we do not conceive the necessity of two distinct periods for the formation of the shell, either of *Cypræa*, *Oliva*, or *Margi-nella*, any more than we do of that of *Bulla*, and other genera, whose mantle either constantly covers the outside of the shell, or is divided so as to envelope it at the



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pleasure of the animal. The external polish and colour in the Cyprææ is certainly owing to the deposition of testaceous matter from that side of the divided mantle of the animal, which, when extended, is applied over the outer part of the shell, and it is to the same circumstance that is owing the more or less regular line or groove that is almost constantly observable along the back of the shells of this Genus. For the sake of perspicuity, it appears necessary to describe the Cyprææ in three different stages; first, in their most complete state, when they are oval, convex behind, rather flattened in front, and the spire almost totally hid by the upper part of the last volution, which is rolled around the inner volutions as if around a longitudinal axis: in this state of full growth the aperture is as long as the shell itself, narrow and dentated on both its edges, which are involute, particularly the outer one; and the whole shell is thick, the front particularly so, and in the far greater number of species the whole surface is finely polished and brilliantly coloured, mostly in a very variable manner, being speckled, spotted, eyed, striped, &c.; but some species are beset in front with grooves and raised transverse lines, and behind with more or less regular tubercles; others, again, are covered all over with transverse raised lines and grooves, and some are cancellated on the surface. In their second, which may properly be termed their intermediate state, the Cyprææ have the same general form, and their outer lip is involute, and both lips dentated, but they are thin and light, their spire is still seen, their front is not incrassated, and they are comparatively but little coloured, having seldom more than transverse bands of a darker colour than the rest of the shell, and in this state they are frequently larger than when full grown. In their third, or juvenile state, the Cyprææ are very different from what they are in the more advanced stages of growth; insomuch that Adanson seems not to have supposed them to belong to the same Genus, though he considered them as nearly related, and actually did observe a great degree of similarity in the structure of the animals. In this state the Cyprææ might be confounded with the more ventricose Cones, but that they are thin, and their columella is not straight; their aperture, moreover, though still longitudinal, is wide, effuse



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at the base, and the outer lip is sharp edged, not at all involute, nor are either of the lips dentated, and the several volutions forming a short spire are strongly marked: in this young state some of the Cyprææ are hyaline and colourless, and have been, consequently, published as Bullæ, to which, indeed, notwithstanding the manifest differences when full grown, the characters of the animal seem to prove its near relation; but upon this subject we can go no further than just to express our regret that our acquaintance with the animal is not sufficient to enable us to draw any conclusions, and that Naturalists who have the means do not seem yet disposed to enter with sufficient zeal upon the study of their natural history.

Arranged by Lamarck next to the *Ovulæ*, to which, indeed, it appears to be evidently very nearly related, the principal mark of discrimination consists in the inner lip of the Cyprææ being dentated, whereas that of the *Ovulæ* never is. Cypræa has never been dismembered, as most other Linnean genera have; an abortive attempt has, however, been made by Montfort, to constitute a genus consisting of the small species that are transversely grooved, such as *C. Pediculus*, &c., but it is not adopted, and, indeed, it appears to us quite needless. The greater number of species of this Genus are inhabitants of the seas of warm climates; most of these are remarkably beautiful; we may mention as the most rare and valuable the *C. Aurora*, or Morning-dawn Cowry; the *C. Mappa*, or Map Cowry; the *C. Testudinaria*, or Tortoiseshell; the *C. pustulata*, or Small-pox Cowry; the *C. aperta* of Swainson, in the Bligh Catalogue, and some others; we need scarcely remind our readers that one particular species, the *C. moneta*, is commonly current as money in some parts of Africa, and that some species are worn as ornaments by the natives of the Islands in the South Seas. Very few are found in temperate climates: one species is all we can boast of on our own shores, this in its different stages of growth has filled at least four different places in the list of British shells. The recent species are, however, very numerous, and so are the fossil; of these latter we have several species in Britain, in the London Clay, and Crag; many others are found on the Continent, as in the Calcaire grossière, in the

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environs of Paris, at Laugnan, near Bordeaux, and in Normandy; also in Italy and Piedmont: we have seen specimens of a very fine fossil species, nearly resembling *C. Mus*, but much larger from the Netherlands: they seem to be confined to the newer formations.

In order to illustrate this Genus, we have been obliged to give two plates, in which are contained the following species :

- Fig. 1. *Cypræa Mauritiiana* in its juvenile state, before the outer lip is formed.  
2. The same species in its intermediate stage:  
3. A beautiful variety of *C. Mappa* in its adult state.  
4. *C. cylindrica*. This, besides being the most elongated species we know, has also another peculiarity, that is, the last volution so much exceeds the rest as to form an umbilicus above the point of the spire.  
5. Two views of *C. pustulata*.  
6. Two views of *C. madagascariensis*.  
7. *Cypræa elegans*, a fossil from Nehou.  
8. *C. Gervillii*, Nob. so named because it was discovered by our excellent correspondent M. De Gerville on his own Birth Day, and therefore eminently belongs to him, it is a beautiful fossil found at Nehou; the following are its specific characters:  
*C. Testa oblonga, lineis transversis plurimis confertis, elevatis, acutis, integerrimis, in partem auticam duplicatis.*

## ANODON.

Anodonta. *Lam.*

**TESTA** æquivalvis, inæquilatera, transversa, plerumque tenuis, epidermide viridi induta. *Cardo* edentulus. *Ligamentum* externum, elongatum. *Impressiones musculares* duæ, postica composita.

IN consequence of their not having any teeth, Linné placed the shells which compose the present Genus among his Mytili, and for the same reason Lamarck, rightly separating it from Mytilus, constituted a new Genus under the name of *Anodonta*, but *Anodon*\* is now generally adopted as being the more correct term. There is such a gradual transition from those shells that may be considered as decidedly Anodontes, to Lamarck's *Conques fluviatiles* through *Unio*, *Hyria*, *Iridina*, *Megadesma*,† &c. that in some instances it is difficult to determine in which Genus a shell ought to be placed: we have, therefore, taken care to figure one of those that, possessing some of the characters that are commonly considered as more appropriate to *Unio*, are, nevertheless, united to *Anodon*, in consequence of the absence of teeth: it is in fact an intermediate shell, and forms, with many other similarly circumstanced species, a decided link in Nature's chain of

\* Leach and Bowdich were the first to alter the generic name from *Anodonta* to *Anodon*; this has been done at the suggestion of our learned friend the Rev. Dr. Goodall, to whom we most gratefully acknowledge our obligations for many useful hints respecting nomenclature.

† Our *Potamophila*, Lamarck's *Galatea*.

## ANODON.

beings; and seeing that, as characters of generic importance, so little dependance can be placed upon the teeth, it might suggest the propriety of uniting under one generic appellation all Lamarck's Naiades, dividing the Genus so formed into several sections by the characters of the hinge; for we find a considerable degree of accordance in the general characters of all: we do not venture to take such a step, because the state of our knowledge is not yet sufficient to enable us to complete the subject in the manner we could wish.

The Anodontes, then, as distinguished from other genera, are equivalve, inequilateral, transverse bivalves, generally very thin, but in a few instances thick, always covered with a more or less dark coloured green or olivaceous epidermis; their hinge line is mostly pretty straight, and their ligament, which is external, is generally elongated. Hinge without teeth. Muscular impressions two, of which the posterior is compound; muscular impression of the mantle entire, seldom distinct. In their young state the Anodontes are most commonly very flat and thin shells, increasing, however, in thickness and convexity with age; this circumstance joined to that of their great variability in general form, depending in a certain degree on their situation, renders the species very difficult to distinguish, and appears to have been the reason that numerous varieties of the common English Horse Muscle have been by some authors considered as so many distinct species. A learned friend of ours, who has taken the pains to collect a great number of series from various localities, has thus proved their identity. Notwithstanding this fact, we have reason to believe that the recent species inhabiting foreign climates are numerous; but we do not know of any fossil species, except we are justified in considering the bivalve from the Coal Measures, figured in "Sowerby's British Mineralogy," tab. 386, under the name of *Mytilus crassus*, as an Anodon; which, upon examination of specimens, we are unable to demonstrate, but we find strong reason for believing that it may prove so.

Fig. 1 *Anodon alatus*, which we have thus named on account of its wing; in which it resembles the *Unio alatus*.

2. *Anodon anatinus*.

## LIMA.



**TESTA** longitudinalis, æquivalvis, inæquilatera, lateribus paululúm incrassatis, utrinque auriculata, uno latere subhians, bysso adhærens. *Umbones* divaricati, parietibus internis extrorsum declivibus. *Cardo* subedentulus, vel dentibus in utrâque valvâ lateralibus binis, inconspicuis, subelongatis. Area ligamenti tripartita, parte medianâ vel foveolâ cardinali supernè rotundatâ, lateralibus elongatis sublinearibus. *Impressio muscularis* lateralis, suborbicularis.



Linné placed the shells which constitute Bruguière's Genus *Lima*, among his *Ostreæ*, but since his time, several authors have separated them from *Ostrea*, and along with the Escalops formed the Genus *Pecten*. There are, however, many species which agree together in certain characters in which they differ from *Pecten*; we therefore approve of Bruguière's and Lamarck's distinctions and adopt the Genus *Lima*. From the *Ostreæ* the *Limæ* may be distinguished by the regularity of their form, and by their not being attached by the outside of their shell, and from the *Pectines* by their obliquity, and also, we believe, in being attached by a byssus; that is, we are certain that *Lima* is attached by a byssus, but as far as we can ascertain *Pecten* is not: still the *Limæ* are evidently very nearly related to the *Pectines*; but there is one more Genus from which *Lima* must be distinguished, a Genus that is only yet known in a fossil state; we mean *Plagiostoma* of Lluyd, which is an oblique shell, as well as *Lima*; but from what we hitherto know of the hinge of *Plagiostoma*, it differs very essentially from that of *Lima*, and *Plagiostoma*, moreover, does not appear to have any opening for the passage of a byssus.

The *Limæ* are longitudinal, that is they are longer than they are broad; they are equivalve, and inequilateral

## LIMA.

shells, the sides rather thickened, gaping a little on one side near the hinge, and having a small ear on each side the umbo. The umbones also are separate or divergent, not approximated, their internal facets being inclined outwards. Lamarck tells us that the hinge has no teeth; but we find, in young shells particularly, two lateral teeth, one on each side in each valve; these teeth are rather elongated, and are certainly much less conspicuous in old shells. The area between the umbones, to which the ligament is attached, is divided as in *Ostrea*, *Pecten*, *Spondylus*, *Malleus*, &c., into three parts; the middle one of which, or the hinge pit, is rounded above, and contains the principal portion of the ligament, while the remainder is attached to the rather elongated, linear, lateral portions. One lateral, suborbicular, muscular impression, from the inner edge of which, the muscular impression of the mantle takes its rise, and making a circuit around the other side of the shell seems to terminate near the beak.

There are many species of this Genus, they are mostly longitudinally grooved or striated, the interstices having in general shorter or longer transverse prominent scales.

They are mostly white, but uncleaned shells have a thin, brown, horny epidermis, which covers the scales as well as the other parts of the shell. Only two or three small species are found on our coasts, of these the *Pecten Loscombi* of Leach, *fragilis* of Mont., and *subauriculatus* of Mont., are among the rarer productions of the coast of Devonshire. All that are known are marine.

Of the fossil species there are also many; we believe they do not occur in any beds below the Lias: in the inferior Oolite there are several species, some of which approach very nearly to some of the recent shells; they are found also in the Calcaire grossière, in France; and one or two small species occur in the corresponding beds, in Italy; but we do not find them enumerated among the inmates of the London Clay, in England. These fossil species that occur in Britain, are figured in "Sowerby's Mineral Conchology."

Fig. 1. Outside of *Lima glacialis*, Lam.

2. Inside of *Lima squamosa*, Lam.; *Pecten Lima*, Linn.

3. Inside of *Lima bullata*, figured by Chemnitz, vii. t. 68, f. 649, b.

4. *Lima Loscombi*, Leach; *fragilis* of Mont.



## NUCULA.



**TESTA** æquivalvis, inæquilatera, transversa, plerumque tenuis, epidermide induta. *Cardo* linearis, foveâ medianâ obliquè præductâ, ligamentum internum gerente, interruptus; dentibus lateralibus utrinque numerosis, acutis, subrecurvis, alternatim insertis. *Umbones* contigui. *Impressiones musculares* duæ, simplices. *Impressio pallii* adhærentis musculi integra.



“EXCEPT in its numerous teeth, this Genus has nothing in common with *Arca* and *Pectunculus*,” is the first observation of Turton, in his “*Conchylia insularum Britannicarum*,” upon this Genus; an observation in no wise according with those of Lamarck, who has placed the *Nuculæ* next to the *Pectunculi*, and who represents them as truly related to the *Pectunculi* and *Arcæ*, but still eminently distinct; and, forming by the situation of the ligament of their valves an evident transition to the *Trigoniæ*, he says, they unite these latter to the family of the *Arcaceæ*; but we find that the opinion of the last mentioned author is partly founded in mistake, for in describing it, he speaks of the ligament as being only partly internal, whereas we find a scarcely distinguishable portion of it to be external, and it is well known that no part of it is internal either in the other *Arcaceæ*, or in the *Trigoniæ*; so that we are strongly disposed to agree with Turton and Leach, who placed *Nucula* in the same family with *Mactra*, and as we discover no resemblance between it and the *Arcaceæ*, except in its numerous teeth, we would separate it from them to unite it to the *Mactraceæ*. Linné, in conformity with the principles upon which his system was founded, placed it together with



## NUCULA.

*Pectunculus* in his *Arca*; we shall, however, in describing *Nucula*, point out the distinguishing marks, but we must first make some general observations on the Genus as it stands in Lamarck, where it appears to us to consist of shells of three distinct characters: first, of shells whose general form is lanceolate; these are nearly equilateral, much broader than they are long, nearly hyaline, very thin, have no epidermis, and are marine; secondly, of shells which are decidedly inequilateral, whose posterior side is rounded, and whose anterior side is produced into a strongly marked beak, and rather pointed; these, moreover, are covered with a strong epidermis, and though we do not venture to pronounce them fresh water shells, we must assert that there are strong reasons for believing some of them at least to be so, a conclusion to be gathered not only from the peculiarities of the shells themselves, but also from their history which has been handed down to us by Schröter, who called one of them *Arca fluviatilis*, and says of it, that it is found in the rivers of the Coromandel coast; this has been called *Lembulus*, by Leach: thirdly, the small, obtusely ovate, inequilateral shells, of a pearly substance within, covered with a strong epidermis, unquestionably marine, and of which, one was formerly Lamarck's type of the Genus, and ought, indeed, even now to be considered as such, because it has suggested the generic name; it is the *Arca Nucleus*, Linn., and *Nucula margaritacea*, Lam.

Notwithstanding the peculiarities of the three kinds of shells above mentioned, we do not feel authorised to separate them into so many genera, but still we think they may be considered as divisions of the Genus.

All the shells that have hitherto been associated in *Nucula* are equivalve, inequilateral, transverse, and generally thin: by far the greater number are covered with a strong olivaceous epidermis. Hinge linear, narrow, divided into two parts, one posterior, and the other anterior, by an obliquely produced central pit, to which the internal ligament is attached; lateral teeth on each side numerous, acute, rather recurved, locking together alternately. Umbones, or beaks contiguous, not separated by an area as in *Arca* and *Pectunculus*. Muscular impressions two, simple. Impression of the muscle of attachment of the mantle without any sinus. The animal

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does not attach itself by a byssus as that of most of the *Arcæ* do. The internal ligament distinguishes *Nucula* from all the *Arcaceæ*.

The few species described by Lamarck, would suggest to us the observation that this is not a Genus abounding in numbers, but we believe he has not mentioned one third of the species, perhaps because he has not the means of discriminating them. We have already mentioned the localities of the known recent species. Of the fossils we are acquainted with many sorts, which from our own knowledge are found in the Crag, the "upper marine formation," the London Clay and Chalk Marle in England, and the corresponding formations in France, particularly the Calcaire grossière, at Bordeaux, Paris, and in the neighbourhood of Valognes; as well as in Italy, at Piacenza. The green sand also furnishes several species in England. We have given representations of the following species as illustrative of the several sections of the Genus we have mentioned:

Fig. 1. *Nucula lanceolata*, Lam.

2. ——— *tellinoides*, a new species lately discovered by Dr. Cheyne, and brought to this country from Cumana; the following are its specific characters: *N. testâ tenui subhyalinâ, transversim elongatâ, subæquilaterâ, antico latere subangulato, postico rotundato; striis exilioribus lineas incrementi obliquè decussantibus.*

3. ——— *fluviatilis*, Nob.; *Arca fluviatilis*, Schröter; *N. rostrata*, Lam.

4. ——— *Pella*, Lam.

5. ——— *rostrata*, Mont. and Turton, but not of Lamarck.

6. ——— *oblonga*, Nob.; *N. lanceolata*, Min. Conch. t. 180; a fossil from the Crag.

7. ——— *margaritacea*, common on our coasts, and differing in several respects from any of the fossils commonly called by the same name.

8. ——— *pectinata*, Min. Conch. t. 192, from the Chalk Marle, at Folkstone.

9. ——— *Cobboldiæ*, a fossil from the Crag, Min. Conch. t. 180.

*Obs.*---The first six of these have a small sinus in the muscular impression of the mantle, they are all, moreover, transversely elongated species, and the superior edges of the shells are without crenulations. The three others are crenulated at the upper edge and have no sinus in the muscular impression of the mantle; they are, also, very different in general form and the hinge pit is not central, and it is placed much more obliquely. Although we think these almost sufficient reasons for constituting two genera, as Leach did for the same reasons, the one *Lembulus*, the other *Nucula*, we

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have not ventured to take such a step, for we much fear that it would prove equally necessary to constitute a third for the reception of the *N. lanceolata*, *tellinoides*, and *oblonga*, which were unknown to Leach.

Our English species are *N. rostrata* of Mont. not of Lam. *N. minuta*, *N. tenuis*, Mont. and *N. margaritacea*.

## TRIGONIA.



TESTA æquivalvis, inæquilatera, transversa, trigona, interdum suborbicularis. *Dentes* cardinales oblongi, lateraliter compressi, divari-  
cati; duo in valvâ alterâ, utroque latere trans-  
versim sulcati, quatuor in alterâ, uno tantum  
latere sulcati. *Ligamentum* externum, crassum,  
marginale. *Impressiones musculares* duæ.



ONE of the most strongly marked genera of regular bivalves established by Bruguière, and adopted by all succeeding writers; indeed, we do not conceive how it can be placed in any Linnean Genus; its extraordinary characters, which we shall now proceed to detail, will show how it is to be distinguished from all other genera.

Shell equivalve, mostly inequilateral, transverse, rather triangular, whence its generic name; sometimes, but very seldom suborbicular. Cardinal teeth oblong, laterally compressed, divaricated, two in one valve, transversely grooved on both sides, the grooves regularly marked, and each forming a segment of a circle; four in the other, which are grooved on one side only, but alternately in pairs, so that the four teeth of this valve receive within their grooved sides the two teeth of the other valve. Ligament external, thick, rather short, marginal. Principal muscular impressions two, lateral, very distinct, one of them placed close to the upper end of the hinge tooth, and rather behind it; the other rather more distant, with another very minute one between it and the hinge tooth. Muscular impression of the mantle very nearly entire.

Only one recent species of this Genus is known; it is a shell of extreme scarcity, which has been brought

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only from New Holland: we suppose it to be marine, but have no certain information upon that subject. It was first published in the "Annales du Museum," vol. 4, under the name *Trigonia margaritacea*, but Lamarck, without giving any reason, has altered its specific name to *pectinata*, in his "Hist. Nat. des Anim. sans vert." We have retained its former name, merely on account of its priority. It has regular tubercular ribs diverging from the umbo and a thin epidermis.

By far the greater number of species of this Genus are either ribbed on the outside, or covered with tubercles placed in regular or interrupted series; a few are only slightly grooved in their young state, or at the rounded side.

The fossil species are numerous, they occur in the Lias, the upper and lower Oolites, and throughout the Oolite series of Phillips and Conybeare; and several species occur in the beds of Green Sand. Those that are found in the Tisbury beds of Portland Rock, frequently have the ligament remaining. We should have been much disposed to doubt the probability of any species occurring in strata above the Green Sand, if Miss Salisbury had not shown us one which she dug out with her own hands at Muddiford: notwithstanding this fact, the *Trigonia* may be said to characterize the beds below the Chalk, and above the Lias.

## RICINULA.



**TESTA** ovata, sæpius externè tuberculato-spinosa, spirâ brevi. *Apertura* longitudinalis, in canalem brevem, posticè recurvum, obliquè emarginatum, terminata. *Plicæ* vel dentes inæquales ad columellam et ad internum labii externi parietem, aperturam plerumque coarctantes. *Operculum* corneum, tenue, semilunare.



THAT *Ricinula* is nearly related to *Columbella* there cannot be the smallest doubt; wherefore, although Lamarck has placed the one in his *Columellaires*, and the other in his *Purpurifères*, we are convinced they ought to be arranged next to each other, and both in the latter family. Indeed the resemblance is so close, that we think it will prove exceedingly difficult if not impossible to ascertain to which of the two genera some particular species are to be assigned. The *Ricinulæ*, so named from their being muricated externally, resembling the seed vessel of the *Ricinus*, are mostly small shells with a slender, semilunar, horny operculum. The only character by which we think they can be distinguished from *Columbella*, is their being covered on the outside with pointed tubercles and spines, but this is not admitted by Lamarck as a constant character: two of the shells he describes as *Ricinulæ* having neither spines nor tubercles. In general their spire is short, we believe never so long as the aperture, which is longitudinal, terminated at the base by a short canal turned rather backwards and obliquely notched. There are a few irregular folds or teeth on the base of the *Columella*. More regular teeth are generally observable



## RICINULA.

just within the outer lip: there are scarcely any traces of these in the young shells of some species, but, as the shells increase in thickness, regular single teeth are formed, and at their full growth the upper one of these consists of four lobes, the next of two or three, and the remainder only are single; in this state these teeth project so far across the aperture as to give it a sinuous and contracted appearance. The folds or teeth near the base of the columella are very irregular; in some species scarcely observable, in others very strongly marked.

This Genus is marine; its species do not appear to be very numerous; the *Murex neritoideus* is the Linnean type of the Genus.

We have never seen any fossil species.

- Fig. 1. *Ricinula horrida*, Lam.  
2. ——— *Morus*.  
3. ——— *digitata*.  
4. ——— var.  
5. ——— *arachnoides*, testa jun.



## ANOMIA.



**TESTA** inæquivalvis, irregularis; *valva inferior* prope cardinem perforata, *operculo* vel *appendici* osseæ affixa; parietibus aperturæ reflexis: *impressio muscularis* unica, subcentralis, orbicularis. *Valva altera impressionibus muscularibus* tribus, approximatis, *basali* majore. *Ligamentum* internum, transversum, sub umbone positum.



WHEN the characters we have described above are attentively considered, we think this Genus is in no danger of being confounded with *Terebratula*, *Placuna*, or any other Genus with which Linneans, even to the present day unite it.

The manner in which it is attached, the peculiarities of its hinge, and its muscular impressions eminently distinguish it, and separate it from all other shells. The *Anomia Ehippium*, Linn., may be considered as the type of this Genus of inequivalve and irregular shells, which is commonly found attached to rocks, shells, sea weeds, &c. by a bony appendage or operculum with a dilated base, and which is in fact only a continuation of the internal or abductor muscle of the animal ossified at its external extremity, and passing through a perforation or nearly orbicular sinus in the flatter or lower valve: the edges of this perforation are turned back, and it is completely closed by this bony appendage. In the lower valve there is a single, orbicular, nearly central muscular impression, but in the upper or concave valve there are three placed close to each other; of these, that nearest the base of the shell is the largest, and it is connected by

## ANOMIA.

means of its muscle with the peg or appendage; whereas the other two are in like manner connected by means of their muscle with the single muscular impression in the lower valve. Ligament internal, transverse, placed just within the umbo in the larger valve, and to a projecting and transversely expanding appendage quite at the base of the flatter valve.

This, like all other irregular attached shells, is usually modified in form according to the substance to which it has adhered to, which circumstance renders it extremely difficult to decide upon what may or what may not be considered as specific characters, the natural consequence of which is that many, mere varieties on account of their situation, have been raised to the rank of species, and described as such: notwithstanding which, we are persuaded that our British species may be reduced to two or three at most: with respect to foreign species, we can say but little, because they are scarcely ever brought home in a state of perfection, or if they be, they are destroyed by the dealers as of no value.

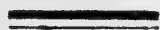
Very few fossil species are known; they are, however, found, though rarely, in the Crag and London Clay, in England; and in the marine formations above the Chalk, in France.

- Fig. 1. *Anomia Ephippium*, outside of the attached valve.  
2. ———— inside of the same.  
3. ———— inside of the upper valve.

## CREUSIA.



**TESTA** compresso-subconica, valvis quatuor, inæqualibus, lateraliter ferruminatis, composita; apicè pervio; basi valvâ testaceâ, modo caliciformi, modo tubulari, madreporis infixâ, clausa: valvæ, antica major, cæteræ subæquales. *Operculum* bipartitum, valvis quatuor compositum.



LEPAS of the Linnean school includes this and all the Lamarckian Cirripedes, which together certainly form a most natural family. The Genus *Creusia* was instituted by Leach, and as he has described it in the "Supplement to Encyclopædia Britannica," it has been adopted by Lamarck; we also think that there is good reason for adopting the Genus, which may be distinguished from most of the other sessile *Cirripedes* by its habitat, and from *Pyr-goma*, with which it agrees in that particular, by the shell being divided into four parts. We cannot, however, approve of uniting the little shell called by authors *Lepas Verruca*, and by Leach *Clitia striata*, (*Balanus striatus*, Pennant,) with *Creusia*, as Lamarck has done, because it differs in every respect, except that of having four valves, which, however, are irregular.

The shell of *Creusia* is composed of four unequal valves, united together by their sides; it is generally flat, slightly conical, and perforated at the apex. The base is a deeply cup-shaped, frequently tubular, testaceous valve, grooved or striated perpendicularly within, and adhering by its lower extremity, or is embedded to its very edge in Madreporæ: the aperture of its superior extremity, which is then even with the Madreporæ, is,

## CREUSIA.

in this case, closed by the four valves which compose the principal part of the shell, of which the anterior valve is the largest, and the others nearly equal. The operculum is bipartite, said by Leach, and in this he is followed by Lamarck, to be undivided, but we have uniformly found each part to be composed of two valves.

The animals of this Genus, as well as of *Pyrgoma*, are frequently found in great profusion, imbedded in various species of Madrepores, they elongate their base in order to keep their surface even with the Madre pore, but it not unfrequently happens that the Madre pore increases so rapidly as to cover and thus destroy them.

The recent species are numerous. We have never seen any fossil, nor are we aware that any are natives of our own coasts.

- Fig. 1. *Creusia gregarea*, Nob. in a Madre pore.  
2. A perpendicular section of the same magnified.  
3. Outside of the four valves, not separated from each other.  
4. Inside of the same.  
5. Outside of the two valves of one part of the operculum.  
6. Inside of the same.

## PYRGOMA.



TESTA compresso-subconica, vel conica, indivisa; apice pervio: basi valvâ testaceâ, modo caliciformi, modo tubulari, madreporis infixâ, clausa. *Operculum* bipartitum, valvis quatuor compositum.



THIS Genus appears to have been instituted by Savigny, and has been adopted by Leach and Lamarck: we find, however, upon examining the collection of Cirripedes, in the British Museum, as it now remains arranged by Leach himself, that since the publication of the "Supplement to the Encyclopædia Britannica," where the characters of the Genus first appear in print, he has divided it into four; upon what grounds we must acknowledge ourselves entirely ignorant, except it be from some differences in the *form* of the shell, and the valves of the operculum. The names which he has given to these four genera are *Pyrgoma*, *Megatrema*, *Savignium*, and *Adna*. We do not consider them sufficiently distinct to constitute several genera, nor do we think that it is for the interest of science that minute differences should be exalted to the rank of generic characters, wherefore we still include all above enumerated under the denomination of *Pyrgoma*, which may easily be known from all other sessile Cirripedes by its upper shell consisting of only one piece, and not of several laterally joined together. Like *Creusia* it is found either sitting upon or fixed in various species of the stony Corals, or Madrepores, and also in some cases entirely overgrown by them: the shell is generally compressed, and somewhat conical, but sometimes regularly conical, open at the apex, and closed at the base by a deeply cup-

## PYRGOMA.

shaped testaceous valve, striated or grooved perpendicularly in the inside; the operculum bipartite, each part composed of two valves, which are variable in form, the posterior one being in some species very much elongated.

There are many recent species of this Genus; those we have represented are the *P. crenatum*, (*Savignum crenatum*, of Leach, in the Brit. Mus.,) and the *P. anglicum* (*Adna anglica*, Leach, in l. c.) the only one that is known upon our coasts, and which is not unfrequently dredged on the coast of Devonshire.

No fossil species are known.

Fig. 1 to 6. *Pyrgoma crenatum*.

7. ——— *anglicum*.

## CORBULA.



TESTA inæquivalvis, subæquilatera, transversa, plerumque gibbosa, clausa. *Dens* cardinalis in utrâque valvâ, conicus, curvus, (*ascendens*,) foveolâ laterali adjectâ. *Ligamentum* internum, denti valvæ minoris, foveolæ majoris affixum. *Impressiones musculares* duæ, laterales, distantes, subirregulares. *Impressio pallii* adhærentis musculi subintegra.



PLACED by Linneans among the *Myæ*, but well distinguished from them by being closed and not gaping, as well as by other characters which we shall detail as we proceed to give the description of this Genus; but we wish in the first place to draw the attention of naturalists to a small river shell, named *Mya labiata*, by Maton, in the "Trans. of the Linn. Soc.," vol. viii., which, however, nearly it may in many respects resemble a *Corbula*, we still hesitate to unite with that Genus, though we do not find characters of sufficient importance to warrant its absolute separation, and in company with its fossil congeners from undoubtedly fresh water formations, constituting a new Genus. It is more compressed than the *Corbulæ*; its larger valve only exceeds the other at the upper edge: it is more acuminate anteriorly; it has two small teeth in the hinge of its larger valve, with an internal and central ligament, and a small accessory muscular impression is placed immediately below each of the principal ones. In most of these respects the fossil species, which forms a very thin stratum, apparently of very considerable extent above the upper fresh water



## CORBULA.

formation in the Isle of Wight, agree with the recent shell from the Rio de la Plata.

The Corbulæ may properly be described as inequivalve, (although one species is known whose valves are very nearly alike,) nearly equilateral, transverse, generally gibbose, not gaping bivalves; but the Myæ are rather irregular though equivalve shells. A single, generally conical, pointed, recurved, (*ascending*) tooth in each valve, with a small, sometimes very deep hollow by the side of it for the reception of the ligament, or the tooth of the opposite valve. Ligament internal, fixed to the tooth of the smaller valve, and inserted in the hollow by the side of the tooth in the larger. Muscular impressions two, distant, lateral, rather irregular. Muscular impression of the mantle with a very small sinus; and in this respect it differs from Mya, in which Genus the sinus is very large.

The Corbulæ are marine; the number of recent species is rather considerable, but they are rare, except the Corb. Nucleus, of Lam.; Mya inequivalvis of English authors, which is frequent on many parts of our coasts: one or two others are also inhabitants of the British Isles. Fossil species are also rather numerous; they occur in the Green Sand, London Clay, and Crag, in England, and in the corresponding formations in other countries.

Fig. 1 & 2. *Corbula gallica*.  
3. ——— Nucleus.

## EBURNA.



**TESTA** ovata vel elongata, nitida, anfractuum suturâ occultatâ. *Apertura* longitudinalis, basi emarginatâ, labio externo simplicissimo, basi unidentato. *Columella* supernè umbilicata, infra umbilicum canaliculata.



THE differences between those shells to which Lamarck first applied the name of *Eburna*, and those which by the general agreement of Conchologists have been appended to them as belonging to that Genus, are so great, that we cannot against our conviction, approve of their remaining united; wherefore our *Eburna*, if it can with propriety be considered as distinct from *Ancilla*, must consist of the *Buccinum glabratum*, Linn. *Eburna glabrata*, Lam. and such others as agree in those characters, which we are of opinion circumscribe the Genus, and which are commonly called “*Ivoires*” in French, whence Lamarck named the Genus *Eburna*. It will be seen that Lamarck has himself united the shells of which we speak all together, continuing to regard the *E. glabrata* as the type of the Genus; but Swainson, thinking that those species which least resemble *E. glabrata*, represent the characters of the Genus in their perfect developements, has selected one of them as the type of the Genus; we hope, however, to show that they do not even belong to it: but we will first point out the characters of *Eburna*, and the marks by which it is to be distinguished from *Ancilla*, to which it is so nearly allied, that we should have hesitated to separate the two genera, if both had not been decisively adopted by authors.

In general form the *Eburnæ* are oblong, or even rather elongated, shining or polished on the outside, and

## EBURNA.

having the suture of the volutions hidden by the deposition of testaceous matter from the mantle, which is divided and spreads all over the shell when the animal is in motion. Spire about half the length of the shell. Aperture longitudinal, its outer edge very even, generally having a very small point at its lower extremity, and deeply notched at its base. In all the above characters, *Eburna* and *Ancilla* accord very nearly, while it will be obvious that they are both separated by them from *Buccinum spiratum*, and its cognate species; but in *Eburna*, the Columella is umbilicate at its upper extremity, by the separation of the inner lip from the lower part of the last volution, and the lower part of the umbilicus forms a double groove which runs round the outside of the twisted Columella; in this consists the difference between *Ancilla* and *Eburna*, the former having no umbilical suture: but here we must observe, that of the known species of *Eburna*, one has it much smaller than the rest, and thus constitutes such a transition from the one Genus to the other, as almost to confirm our doubts, as to the propriety of separating them. The marks, by which *Eburna* is to be distinguished from the other shells that have been associated with it by Lamarck and others are, the shells not being naturally polished on the outside, their being covered with an epidermis, the volutions in most species being separated by a canal, and the umbilicus when it exists, being at the lower part of the Columella: they have also an internal channel at the upper angle of the aperture; first noticed by Swainson.

The true *Eburna* should be placed next to *Ancilla*, and not where Lamarck has arranged them, among the *Purpurifères*; they have no operculum, and are marine: three or four species only are at present known; one alone is described: we have represented at

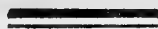
Fig. 1 & 2. *Eburna glabrata*. Lam. *Buccinum glabratum*, Linn.  
3. & 4. ——— *balteata*, Nob. Testâ cylindraceo-oblongâ, spirâ sub-conicâ, anfractu ultimo supernè incrassato; infernè balteato.

*Obs.*---A little shell differing in form, and in the dimensions of its umbilical suture from *E. glabrata*; we are unacquainted with its locality.

## PILEOLUS.



TESTA patelliformis, vertice subcentrali, recto. Discus inferus, parte centrali pulvinulatâ; aperturâ exiguâ, sublaterali, semilunari, labio externo marginato, interno crenulato. *Spira* omnino interna, brevissima.



A NEW Genus of shells related to *Nerita* which has been discovered about a twelvemonth since by the Rev. George Cookson, who has named it *Pileolus*, from its resemblance to a little cap. For some time we hesitated about its relative situation, because in its general form it so exactly resembles the *Patellæ*, while the structure of its inferior disk is so unusual in appearance, that it was not until we had broken one, and thereby discovered its internal spire, that we concluded upon its relation to *Nerita*; we had even at one time a suspicion that it might prove to be a bivalve, something like *Hipponyx*; but this suspicion was founded upon the examination of a specimen, which we are now persuaded, has some very young oysters attached to its upper surface.

Shell of an obtusely conical form, with a nearly regularly orbicular base, and its vertex very nearly central and upright. In the lower disk, of which the center is rather prominent and cushion shaped, is placed the small rather lateral, semilunar aperture, whose internal lip is crenulated, and whose external lip has a raised margin. The spire is entirely internal and very short.

Of this interesting and indeed singular Genus only two species have been found, both of which are named

## PILEOLUS.

by their discoverer. We now proceed to give their specific characters :

1. *P. plicatus*, testâ obtusé conicâ, plicis radiantibus ex verticé ad marginem decurrentibus; margine irregulariter crenulato : parte centrali disci inferi divisâ.

2. *P. lævis*, testâ planulatâ, margine integro.

*Obs.*---The radiating plicæ on the outside of *P. plicatus*, is not the only character by which it is distinguished from *P. lævis*; this latter is flatter, and the cushion like center of the inferior disk is entire.

Both these species are fossil; they occur together in the coarse upper layer of Oolite, above which lies the Bradford Clay, containing *Apiocrinites rotundus* of Müller, at Ancliffe, and have also been found in a similar stratum at Charter-house Hinton, in Somersetshire; where they are associated with a minute *Nerita*, and many other marine fossil shells, several of which we have only seen from this identical bed.

Fig. 1. *Pileolus plicatus*, to show its elevation.

- |    |       |       |                                       |
|----|-------|-------|---------------------------------------|
| 2. | _____ | _____ | upper surface.                        |
| 3. | _____ | _____ | lower surface.                        |
| 4. | _____ | _____ | the same magnified.                   |
| 5. | _____ | _____ | <i>lævis</i> , to show its elevation. |
| 6. | _____ | _____ | upper surface.                        |
| 7. | _____ | _____ | lower surface.                        |
| 8. | _____ | _____ | the same magnified.                   |

## RANELLA.



**TESTA** ovalis vel oblonga, depressiuscula varicibus plùs minùsve obliquis, utroque latere seriem longitudinalem efformantibus onusta. *Apertura* subovata, basi canaliculata, superné plerumque canalifera.



A VERY natural Genus which may be known at the first glance, by the two lateral rows of varices and by the general form, which in most species is such as to have obtained for them the common name of *Frogs*, from whence *Ranella*: but we must remark, that these rows of varices are not always regular, and that there are some species which approach *Triton*, in having the varices rather more distant from each other than the length of half a volution. With the exception, however, of the *Tritones*, we believe there is no danger of the *Ranella* being confounded with any other Genus, for it is easily distinguished from *Murex*, which has at least three rows of varices to each volution. It does not appear to us to be related to *Struthiolaria*, though Lamarck seems to consider it as in some respects intermediate between *Struthiolaria* and *Murex*.

We must not omit to notice a singular opinion advanced by Lamarck, that “on the addition of every new piece which the growth of the animal obliges it to make to its shell; this animal comes out and exposes itself for the entire length of an half volution, and thus remains stationary until the new half volution is formed:” which “fact,” he says, “is indicated by an examination of the shell, and evidenced by the varices being constantly disposed on the two opposite sides.” Upon this we shall,

## RANELLA.

however, only observe, that it does not appear in the slightest degree probable, much less necessary, in order to account for the particular form of these shells, that the animal should adopt a different mode of constructing its habitation from that adopted by all other animals of the same class; which, it is well known, is by depositing from their mantles successive layers of testaceous matter around the edge of their apertures, *without* being obliged to expose themselves to unnecessary danger by coming out, and remaining until an entire half volution has been formed.

The Ranella are generally ovate, sometimes oblong, (and in the oblong species, the varices are not so regularly distichous as in the ovate,) very slightly depressed in reality, yet having the appearance of being peculiarly so, on account of the breadth of the varices; which form in general a regular row on each side, more or less obliquely placed. On the outside, the Ranellæ are always covered more or less closely with tubercles and rows of small beads, and the varices are sometimes, but not often, spinous. Specimens are very seldom brought to this country with their epidermis, but such as have any remains of it, prove it to be a thickish olivaceous coat. Their aperture is rather ovate, with a more or less lengthened canal at its base, and frequently also at its superior extremity; the inner lip is mostly rugose, and the inside of the outer lip grooved, and its edge crenated or dentated. We have never seen its operculum.

The Ranellæ are marine: the species are not very numerous, most of them are inhabitants of the East Indian Seas. There are very few fossil species; those that we have seen are found in the London Clay.

Fig. 1. *Ranella candisata*, Lam. *Murex candisatus*, Chemn. *Murex conditus*, Gmel. A very scarce and valuable shell from New Guinea; for the loan of which we are indebted to Thomas Johnstone, Esq.

2. ——— *spinosa*, Lam.

3. ——— *marginata*. *Buccinum marginatum*, Gmel. *Ranella lævigata*, Lam. A fossil species from Piacenza: there is a recent shell very nearly resembling this.



## STOMATIA.



TESTA internè margaritacea, suborbicularis, vel oblonga, auriformis, depressa, spirâ plerumque prominente, interdum inconspicua, marginali. *Apertura* integra, plerumque longitudinalis, vel suborbicularis, vel elongata, amplissima, marginibus integris, supernè conjunctis.



IN his observations upon *Stomatella*, Lamarck tells us, that in respect to their general form, they appear to be nearly related to the *Stomatia*; and that they are principally distinguished by the transverse ridge and the elevated outer lip of the *Stomatia*. Upon a careful examination, however, of ten species, we are unable to discover any difference in the outer lip; and it will be observed, that Lamarck places among his *Stomatellæ* one species, the *S. rubra*, which has a nodular *keel* placed exactly in the same position as the transverse ridge by which he characterizes *Stomatia*; so that, in fact, we do not find any generic difference whatever, and have therefore united the two Lamarckian genera, under the appellation of *Stomatia*, which has been long applied to one of them. The Genus thus formed may be described as follows: Shell pearly within, mostly coloured externally; suborbicular or oblong, generally ear-shaped and depressed. In most species the spire is prominent, but not produced, nor elongated; sometimes, however, it is very small, marginal, and inconspicuous. Aperture mostly longitudinal, in some species nearly orbicular, in others much elongated, always very large; its edges entire, united at the upper part, and scarcely modified or altered in form

## STOMATIA.

by any portion of the last volution. Volutions from two to four. Muscular impressions two, seldom distinct, nearly marginal, and in the open part of the shell.

*Stomatia* appears to be related to *Haliotis*, and is therefore rightly placed by Lamarck in his *Macrostomes*; one of its species is arranged as an *Haliotis* by Linneans, under the name of *H. imperforata*; of course its distinguishing mark is very easy. We do not pretend to discuss the question of their resemblance to Lamarck's *Turbinacées*; but only observe, that in general form, some of them approach very nearly to some of Lamarck's *Monodontes*.

The *Stomatia* are marine; all the species we have seen, have been brought from the East Indies and New Holland. We have never seen any fossil species.

- Fig. 1. *Stomatia imbricata*; *Stomatella imbricata*, Lam.  
 2. ——— *sulcifera*; ——— *sulcifera*, Lam.  
 3. ——— *duplicata*, Nob. Testa suborbicularis, spirâ prominulâ, anfractibus medianè bicostatis, prope suturas undulatis; costis leviter nodulosis; apertura orbicularis.  
 4. ——— *Phymotis*, Nob. *Stomatia Phymotis*, Lam. *Haliotis imperforata*, Chemn.  
 5. ——— *Auricula*; *Stomatella Auricula*, Lam.  
 6. ——— *planulata*; ——— *planulata*, Lam.

## SIGARETUS.



TESTA suborbicularis, subauriformis, depressa, spirâ submarginali, vix prominulâ. *Apertura* integra, dilatata, altitudine latitudinem superante; marginibus supernè disjunctis: labio interno brevi, spiraliter intorto.



A GENUS of internal shells, which we judge from the slight acquaintance we have with it, to belong to the same family with Lamarck's *Bullæa*, *Aplysia*, and *Dolabella*, but placed by him in the *Macrostomes*, near to *Haliotis*, evidently on account of its general form and its dilated aperture. As far as the differences in the shells themselves warrant it, our opinion is decidedly against the separation of Blainville's *Cryptostoma* from this Genus; nor do we think the animals sufficiently different to render the propriety of separating them very clear.

In general form, the Sigareti are rather orbicular, ear-shaped, and depressed, mostly with a nearly marginal, scarcely prominent, sometimes very compressed spire. The aperture is entire, much dilated, longer than wide; its edges disunited at the upper extremity, owing to the outer lip embracing in its increment the lower part of the last volution, of which there are two or three at most: inner lip short, spirally twisted, in general a very little reflected at its upper part, but sometimes so much so, as to form a small umbilicus. Two muscular impressions may generally be traced, one at the upper and the other at the lower extremity, and rather within the mouth.

The Sigareti are marine; only a few species are known, none of them inhabitants of our coasts. Adanson arranged them with *Haliotis*; from which, however, they

## SIGARETUS.

can most easily be distinguished by their want of the dorsal perforations. With the Lamarckian genera *Stomatia* and *Stomatella*, they might much more easily be confounded, but the substance of their shell is never pearly; they are partly internal shells, and the aperture is always more or less modified by the last turn of the spire.

The fossil species are few and rare; they occur in the London Clay at Barton, and in the contemporaneous formations in France and Italy: the species in the Calcaire grossière at Grignon, has a small umbilicus.

We know not why Lamarck has arranged *Nerita cancellata* of Chemnitz, with *Sigaretus* rather than with *Natica*. Much confusion seems to reign in Lamarck's synonymy of his *Sig. haliotoideus*, inasmuch as he quotes figures of several very distinct shells for it; witness his reference to Martini Conch. I. t. 16. f. 151 to 154, and to *Bulla velutina*, Müller Zoolog. Dan. III. t. 101. f. 1 to 4, which is an external shell, and in our opinion, identical with the English *Helix lævigata*.

Upon examination of the specimens in the British Museum, we are convinced that De Blainville's *Cryptostoma Leachii*, is the same as one of the two shells which Adanson calls *Sigaret*; his *Crypt. breviculum* is probably the other; but this we cannot ascertain, because the shell has been taken away from the specimen in the British Museum. We have no doubt, however, that the *Crypt. breviculum* of De Blainville, is a female specimen of Cuvier's *Sigaretus*, given by him to Dr. Leach. It is to be regretted, that Cuvier has not given any description of the shell of his *Sigaretus*, so that it is impossible to ascertain whether or not it be identical with either of Adanson's shells; it is, perhaps, needless to add, that unless it can be identified with one of them, it ought not to be considered as a *Sigaretus*. Its animal is certainly very different from that of *Cryptostoma Leachii*, which we believe to be identical with one of Adanson's.

Fig. 1. *Sigaretus concavus*, Lam.

2. ——— *haliotoideus*?

3. ——— *Leachii*. *Cryptostoma Leachii*, De Bl.

4. ——— *canaliculatus*, Deffr.

## PHOLADOMYA.



TESTA tenuis, subhyalina, transversa, ventricosa, posticè brevis, rotundata, anticè plùs minùsve elongata, hians; superné hiantula. *Cardo*, foveolâ elongato-subtrigonâ et laminâ marginali in utrâque valvâ. *Ligamentum* externum, breviusculum, externæ laminarum cardinis parte affixum. *Impressiones musculares* duæ, indistincti. *Sinus* impressionis musculi adhærentis pallii, magnus. *Umbones* approximati.



WE rejoice in the opportunity of introducing this entirely new Genus to the notice of our readers, which the kindness of Mrs. Mawe has allowed us, particularly as the discovery of a single recent species has led to the more perfect knowledge of several fossils, whose Genus was before exceedingly doubtful, insomuch that from a consideration of their external appearance alone, authors have been induced to place them in several genera, to none of which they really belong. The only specimen that we have ever seen was brought from the Island of Tortola, by Mr. Nicholson, it was picked up on the coast, and from its extreme tenuity, as well as its resemblance to the Pholades, we are tempted to believe that it may be one of that class of shells that protect themselves from the fury of the ocean in cavities perforated in stone; or at least that it must live buried in the sand: for there is no other evidence, even among the numerous fossil species, of its being a piercing animal.

The following generic character being drawn up, principally from the recent specimen, several particulars

## PHOLADOMYA.

will be mentioned in it which cannot be observed in the fossils; there is not, however, the smallest doubt as to their generic identity. Shell very thin, rather hyaline, transverse, ventricose; inside pearly; posterior side short, sometimes very short, rounded; anterior side more or less elongated, gaping; upper edge also gaping a little. Hinge with a small, rather elongated, triangular pit, and a marginal lamina in each valve; to the outer part of which is attached the rather short external ligament. Muscular impressions two: these, as well as the muscular impression of the mantle, in which there is a large sinus, are indistinct. This shell is the only instance we have ever seen in which the umbones are so approximated, as to be worn *through* by the natural action of the animal in opening and closing its valves.

The general aspect of this shell, is between that of *Pholas* and *Anatina* of Lamarck, but most of the fossil species have been arranged as *Lutrariæ*. We have called it *Pholadomya*, with reference to its resemblance to shells of two Linnean genera, the *Pholades* and *Myæ*. It is related to *Panopæa* in the characters of the hinge, but may be distinguished from that Genus by its thin, semitransparent, pearly shell: from *Pholas* and *Anatina*, by its external ligament, and its want of external and internal accessory valves: and lastly, from the Lamarckian *Myæ*, by not having the unequal teeth of that Genus.

The fossil species of this new Genus, are represented in Sowerby's Mineral Conchology, t. 197, 225, 226, 227, 297, and 327, under the names *Cardita? producta*, *obtusa*, *lyrata*, *deltoidea*, and *margaritacea*; and *Lutraria lyrata*, *ovalis*, *ambigua*, and *angustata*. They occur in several rocks of the Oolitic series, particularly the Cornbrash, Inferior Oolite, and Fuller's Earth; as well as in the Lias, the London Clay, and the Sutherland Coal-field: also in the dark coloured Clay, between the Chalk Marl and the Plastic Clay? at Alum Bay.

Our plate represents four views of *Pholadomya candida*; testâ transversim oblongâ, posticè brevissimâ, rotundatâ; medianâ parte striis divaricatis, decussatis, ab umbone decurrentibus; antice elongatâ, subquadratâ.

## THECIDIUM.



**TESTA** inæquivalvis, subirregularis, subæquilatera, externâ valvæ concavæ parte affixa; imperforata. Valva infera processibus duobus cardinalibus, internis, brevibus, et areâ irregulariter subtrigonâ ad umbonem acutiusculum extensâ. Valva altera planiuscula, basi externè appendiculâ brevi, obtusâ; internè processibus duobus lateralibus cardinalibus, et lamellis configuratione variâ. *Ligamentum* nullum.



**SEPARATED** with great judgment from *Terebratula*, by M. De France, being attached by the outside of the shell, while the *Terebratulæ*, as we have shown in a former number, are fixed by a fibrous substance passing through the aperture at or near the point of the umbo. We have corrected the generic name from *Thecidea* to *Thecidium*, at the recommendation of our learned friend the Rev. Dr. Goodall.

Shell inequivalve, rather irregular, nearly equilateral, attached by the outer part of the concave valve; imperforate. Lower valve with two internal, short, cardinal processes, and an external, rather irregularly triangular area extended to the umbo, which is somewhat acute. Upper valve rather flat, with a small, short, obtuse appendage at its base externally, and two small lateral cardinal processes within, and variously curved laminæ always attached to the inner disk of the shell. Hinge without any ligament, but the valves cannot be separated without some portions of the lateral processes being broken: in which respect it resembles the greater number of the *Brachiopoda*.

Of the recent species of this Genus, the configuration of whose internal laminæ is so singular, we are at pre-



## THECIDIUM.

sent only acquainted with one, which we have represented; it has been brought rarely, in company with the common red coral, from the Tuscan Seas: some French *Savans* have considered it as a *Crania*, but it is evidently distinct from that Genus, inasmuch as it has hinge processes, which the *Crania* has not. The fossil species are more numerous, we suspect one of them has been published by Lamarck as a *Terebratula*, under the name of *T. pumila*, but his reference to *Magas pumila* of Mineral Conchology renders this somewhat doubtful.

Those that we have seen appear to belong to the Chalk, and have been brought only from Maestricht; and from Orglandes in Normandy.

We have represented in our plate the following, viz.:

Fig. 1. *Thecidium pumilum*, *Terebratula pumila*? Lam. showing the two valves together.

2. ——— the same, showing the inside of both valves.
3. ——— *digitatum*, Nob. Valva superior internè lamellis digitatis.
4. ——— *recurvirostre*, De Fr.
5. ——— insides of the same.
6. ——— from the Mediterranean; we do not venture to name this species, because we will not interfere with De France's unpublished account of this Genus.
7. ——— insides of the same.

## CARDITA.



TESTA æquivalvis, inæquilatera, suborbicularis vel subtransversa; extus plus minusve radiatim sulcata: margine crenulato. *Dentes* in valvâ alterâ duo, obliqui, alter elongatus, crassus; alter subrectus, breviusculus: in alterâ dens unicus, elongatus, crassus, obliquus. *Impressiones musculares* duæ, subovales, laterales. *Impressio muscoli adhærentis pallii*, integra.



LAMARCK appears to us to have separated Venericardia from his Cardita without sufficient reason; we have not hesitated to unite them because we do not find any character by which they can be distinguished. We wish, however, to reserve our opinion upon such of his Carditæ, if indeed there be any such, as attach themselves by a byssus in the same manner as the *Mytili* and the *Arce*: not that we have any further evidence of the existence of such species than an observation of Lamarck, which he only gives from hearsay, whereas he particularly mentions in the generic character of his *Cardita*, that it is free.

Shell equivalve, inequilateral, suborbicular, or somewhat transverse, with more or less strongly marked grooves on the outside, passing from the umbo to the upper margins; which are crenulated within. Teeth in one valve two, generally oblique, one of them elongated, thick, mostly rather curved; the other sometimes straight, short, also thick; in the other valve one elongated, thick and oblique tooth, and a deep elongated cavity for receiving the larger tooth of the other valve. There is sometimes also another indistinct tooth in this valve. Muscular impressions two, rather oval, lateral. Muscular impression of the mantle entire.

Very nearly related to Cypricardia of Lamarck, but distinguished from that by the number of hinge teeth:

## CARDITA.

we do not know of any other Genus with which it may be confounded, except it be *Cardium*, with which it agrees in the regular ribs on the outside; but the *Cardium* is generally nearly equivalve, and besides two hinge teeth in each valve, it has a distant lateral tooth on each side of the umbo.

Of the Lamarckian *Cardita* and *Venericardia* together, there are a considerable number; those which he has called *Venericardia* being all fossil except one. They are all marine; and when living, have a thin horny epidermis. The fossil species occur in the newer formations above the Chalk; several are found in the London Clay, and Calcaire grossière, as well as in the Crag.

We have given in our plate the following species:

Fig. 1. *Cardita calyculatus*.

2. ——— the same showing the inside of both valves.

3. ——— *sulcatus*. *Chama antiquata*, Linn.

4. ——— *imbricatus*.

## CYPRICARDIA.



**TESTA** æquivalvis, inæquilatera, obliquè vel transversim elongata, latere postico brevissimo. *Cardo* dentibus tribus infra umbonem et dente laterali, subelongato, anticè porrecto. *Impressiones musculares* duæ, subirregulares, laterales.



THIS Genus as it is established by Lamarck, contains shells of very different characters, for without taking upon us to decide about the propriety of uniting his *C. coralliophaga*, (a shell whose animal perforates Corals) with his *C. guinaica*, *angulata*, and *rostrata*, (which certainly have not perforating animals, though they may probably attach themselves by a byssus,) we must proceed to mention that his *C. modiolaris* undoubtedly belongs to our *Astarte*, (his *Crassina*), and we believe the same to be the case with his two last species *C. obliqua* and *trigona*. On account of our slight acquaintance with this Genus, its species being so rare, we are induced to give it a place in order to direct the attention of conchologists to it, and thereby to obtain such information as shall enable us to assign to it its proper place in the system.

Shell equivalve, inequilateral, obliquely or transversely elongated, with the posterior side very short. Three teeth are placed in each valve just within and behind the umbo, and one rather elongated lateral tooth is extended towards the anterior side. There are two rather irregular, lateral muscular impressions; but the muscular impression of the mantle is so indistinct, we cannot ascertain whether or not it is entire.

## CYPRICARDIA.

The Cypricardiæ are marine, they resemble the Carditæ very much in general form and in the elongated anterior tooth, but differ from them in having *three* teeth placed under the umbones. Bruguière had united them together, and we confess that we should approve of that union, did we not see reason to believe that the *Cypricardiæ* affix themselves by means of a byssus, wherefore we should think they might very well form one Genus with such of Lamarck's *Carditæ*, as are also attached by a byssus; if, indeed, there be any such, (we think *Cardita phrenetica*, Lam., *Chama semiorbiculata*, Linn, is one); and that we should not place much dependance upon such a character, as a difference in the number of hinge teeth.

Our figure is drawn from a specimen of *Cypricardia oblonga*, *Chama oblonga*, *Linn.* in the British Museum.

## STROMBUS.



TESTA oblonga, turrita, subventricosa, basi in canalem brevem, emarginatum vel truncatum desinens. *Apertura* plerumque elongata, supernè in canalem brevem, interdum supra spiram elongatum, extensa. Labium externum ætate ampliatur in alam simplicem, integram, supernè lobatam, infernè lacunâ â canali distinctâ interruptum.



THE only characters, by which *Strombus* is distinguished from *Pteroceras*, are its winged outer lip not being divided into digitations, and its short basal canal; and these we apprehend are sufficient to distinguish it from the few genera to which it is related. There are, indeed, two or three species of *Strombi*, which very nearly resemble some of the *Rostellariæ*, but the situation of the sinus near the lower end of the outer lip may be regarded as the distinguishing mark. Upon the whole, *Strombus* may be considered as well marked a Genus under the Lamarckian system, as it was a family under the Linnean; its species having scarcely ever been arranged under other genera, and species of other genera having very rarely been confounded with it. We can only charge our memory with one instance, in which a small species of *Strombus* has been generally placed as a *Murex*; it is published by Sowerby in the Mineral Conchology, under the name of *Murex Bartonensis*, (M. C. t. 34.)

The *Strombi* are in general oblong shells, with a more or less acutely turritated spire; sometimes they are rather ventricose, and their base generally terminates in a short emarginated or truncated canal. The aperture is mostly elongated, rather more so than that of the *Rostellariæ*, and terminated at its superior extremity by

## STROMBUS.

a short canal in most cases ; very seldom by an elongated narrow canal extended nearly to the point of the spire. The outer lip is sharp edged and entire when young, but becomes more or less expanded and thickened with age, when it forms a simple, entire wing, lobate at its upper edge, very rarely having several small notches both at the upper and lower ends ; but having a distinct, and in most cases very strongly marked sinus near the inferior extremity : in one or two instances this is very indistinct, particularly in the *Strombus cancellatus* of Lamarck.

These marine shells are found in warm climates, there is a considerable number of recent species, some of which have been lately illustrated by Swainson, and we believe there are still several not described by Lamarck, though some of those given by Swainson, are evidently published under different names by Lamarck. There are no recent indigenous species in our islands.

Fossil species are rare, and as far as we know, exist only in the newer formations above the Chalk ; the London Clay at Barton furnishes one species ; the Calcaire grossière of Paris another ; a third is found in the contemporaneous formation at Bordeaux, and two or three in the tertiary Traps of Vicenza.

Two plates of Strombi are given, of which the first represents three varieties of *Str. pugilis*, Fig. 1, 2, and 3.

Fig. 4. *Strombus Auris Dianæ*.

5. ———— *variabilis* var, Sw.

6. ———— *tridentatus*.

7. ———— *Fissurella*, Linn. *cancellatus*, Lam.

8. ———— *decussatus*, De Fr.

An operculum from a young specimen of *Str. gigas*, is also given.



## ROSTELLARIA.



TESTA turrita, vel fusiformis, basi acutâ. *Labium externum* plus minusve ætate dilatatum, vel integrum, vel dentatum, vel digitatum, basi lacunâ canali contiguâ instructum. *Aperitura* oblonga, supernè in canalem elongatum, supra spiram, extensa, infra in canalem acutum desinens.



THE Lamarckian Genera *Rostellaria*, *Pterocera*, and *Strombus*, with a very few shells from other Linnean Genera, form together that very natural family which Linné designated by the generic appellation of *Strombus*. Perhaps, also, the *Struthiolaria* should be added to this family. We have endeavoured to modify and amplify the character of *Rostellaria* in such a manner, as not only to include all the species that Lamarck intended to combine together, but also so as to show the permanent distinctive characters between it and the allied genera; and in doing so, we have been obliged to admit as a character of the Genus, the generally elongated, always distinct, canal, which runs up the spire; this canal is, indeed, observable in two or three *Strombi*, but those have always another mark of distinction. As it appears necessary for the purposes of science that genera should be defined, we have retained in our definition of this Genus, such characters as will still include the *Str. Pes-Pelecani*, though we confess that we think that and its cognate species might very well have been separated from the *Rostellariæ*, as forming a new Genus. We have not ventured upon such a separation, because we wish as much as possible to avoid innovation, where it is not imperiously called for.

Our knowledge of the *Rostellariæ* is confined to the shell itself, excepting that we have the operculum of the *R. Pes-Pelecani*, which resembles that of the *Pterocerata* and the *Strombi*.

## ROSTELLARIA.

Shell turrit or fusiform, the spire in all cases much longer than the aperture; and, as we believe, always acute at the base. Aperture oblong, its superior extremity extended into the form of an elongated, very narrow canal, which runs up, sometimes to the top of the spire, and then frequently turns downwards on the other side; its inferior extremity also forming a more or less lengthened canal, pointed at the base. Outer lip more or less dilated with age, entire, or dentated at its lower edge, or divided into several fingers. The upper volutions of the Rostellariæ are generally longitudinally grooved, particularly of such as have their outer lips either entire, such as *R. Columbaria*, or dentated, as *R. Fusus*: but they are carinated or tuberculated in those that have the outer lip divided into fingers, such as the *Pes-Pelecani*: and these have as many rows of tubercles, or the same number of carinæ on the lower volution, as there are digitations to the outer lip. The lower extremity of the outer lip is sinuated close to the pointed canal, and by this character, the Rostellariæ are distinguished from the *Strombi* and *Pterocerata*, in both of which, this sinus or emargination does not nearly approximate to the lower canal; this character, moreover, is the only one that separates *Pes-Pelecani* from *Strombus*, and compels us to place it with Rostellaria, as we think contrary to its natural affinity.

The Rostellariæ are naturally covered with a thin horny epidermis, and they have a thick horny operculum which is only attached to the foot of the animal by about half its surface, it is of an oblong shape, rounded at one end, and pointed at the other. Only a small number of recent species are known, one of which is a remarkable shell, on account of its scarcity and the extraordinary length of the lower beak; it is the *Strombus Clavus*, Gmel.; Rost. rectirostris, Lam. The *R. Pes-Pelecani* is the only one found on our coasts. Fossil species are more numerous, they are mostly remarkable shells; several with entire, but sometimes excessively dilated outer lips are found in the London Clay; of these the *Strombus latissimus* of Brander, is a distinguished fossil: other, more strombiform species occur in the Green Sand. The *Calcaire grossière* of Paris, and the tertiary beds of Bordeaux and Italy, furnish several species.

## PTEROCERAS.



**TESTA** subturrita, ovato-oblonga, subventricosa, anfractu ultimo majore, basi in canalem elongatum, plerumque recurvum desinens. *Apertura* oblonga, in canalem, interdum duplicatum supernè extensa. *Labium* externum ætate dilatatum, in alam digitatam, infernè lacunâ interruptam distinctum. *Operculum* corneum, crassum, oblongum, basi acutum.



**DISTINGUISHED** from *Rostellaria*, as we have shown before, by the position of the sinus near the base of the outer lip; also by its short spire, and its outer lip being divided into variously curved digitations; this latter character, joined to its elongated, generally curved canal at the base, will serve also to distinguish it from *Strombus*.

Shell ovately oblong, rather ventricose, turrit, spire short, with the last volution very large, and its base generally produced into an elongated, mostly recurved pointed canal. Aperture oblong, its upper extremity extended into a sometimes double canal. Outer lip thin and sharp edged when young; but when full grown, thickened, and expanded into the form of a wing, divided into several horns or digitations, whence the name *Pteroceras*, and having a strongly marked sinus near the lower part, but not close to the base.

*Operculum* horny, thick, oblong, rounded at the upper part, by which alone it is attached to the foot of the animal, and pointed at the lower end, exactly like that of *Strombus*.

Lamarck describes only seven species of *Pterocerata*, all of which are recent; nor have we ever seen any fossil

## PTEROCERAS.

specimens; but Swainson, in his *Exotic Conchology*, has added to the number of recent species, and from our own observations, we are convinced that there are still several others undescribed. The singular digitations of their outer lip and the two canals, spreading and curved in all directions, render these shells very remarkable, and have obtained for them the common appellations of Spiders, Scorpions, &c. A thin horny epidermis coats their generally tuberculated outside in their natural state. One or two species have a single horn projecting between the sinus, near the base of the outer lip and the lower canal.

We have restored the *s* at the termination of the generic name, in conformity with the termination of the Greek neuter substantive *νεγας* from which it is derived: the Latin adjective specific names should consequently be neuter.

## SIPHONARIA.



**TESTA** ovata, depresso-conica; subtus concava: vertice subobliquo, posticè recurvo: *impressio muscularis* anticè capite, et lateraliter canali interrupta; ad extremitates paulùm expansa.



In general form and appearance this new Genus approaches very nearly to *Patella*, with which it has hitherto been united by all authors; its lateral canal, and the vertex being obliquely turned backwards, may be considered as its principal distinguishing characters, separating it not only from *Patella*, but from *Emarginula*, whose canal is anterior, and vertex posterior. The animal inhabitant of one species of this Genus appears to have attracted the attention of Adanson, who has shown that it differs materially from that of *Patella*, and agrees more nearly with that of *Emarginula* and *Fissurella*, particularly in the situation of its branchiæ. Adanson's *Mouret* and the commonly called *Patella Sipho*, may be regarded as typical species of this Genus.

Shell ovate, above rather depressedly conical, beneath concave; vertex, when not eroded, obliquely turned backwards, exactly in the opposite direction to the canal, which is on the right side. Within, the muscular impression is observable, it is commonly very distinct, and nearly surrounding the inside at rather less than half way from the edge to the lowest point; interrupted in front by the head of the animal, and on one side by the canal, so that between the canal and the head, there is an irregularly suborbicular muscular impression only connected with that of the other side of the shell by a

## SIPHONARIA.

very narrow line, over which lies the head of the animal: the extremities of the muscular impression are rather expanded, particularly that immediately behind the canal. The canal itself sometimes forms a distinct groove within the shell, running from the vertex to the margin, and a corresponding prominence may be observed on the outside, forming a ridge from the vertex to the margin: but the internal groove and the external ridge are not always distinct; the place of the head and that of the canal can, however, be easily distinguished in all cases.

We are acquainted with seven or eight species of this Genus, all of which are recent, and marine; we have them from Brazil, the West Indies, Senegal and Tristan d'Acunha.

In our plate are represented,

Fig. 1. *Siphonaria Sipho*.

2. ———— *concinna*.

3. ———— *Tristensis*. *Patella Tristensis*, *Leach*.

4. ———— *exigua*. *Lepas exigua*, *Martini*.

## FISSURELLA.



**TESTA** clypeiformis, aut depresso-conica, plerumque oblonga, subtus cava; vertice antico, pertuso: striis plerumque ex vertice ad marginem decurrentibus, lineis incrementi decussatis. *Impressio muscularis* lateribus anticis latior.



THE Fissurellæ were formerly associated with *Emarginula*, *Parmophorus* and other modern genera, under the generic name *Patella*; several of these agree very nearly in their general form, but are distinguished by certain peculiarities which characterize in some instances a considerable number of species: those which are referable to the present Genus, are remarkable for having the vertex perforated, which character will prevent their being confounded with any other. This Genus was separated from *Patella*, by Bruguière, because he considered the perforation of the vertex as an indication of remarkable diversity in the structure of the animal, sufficient to warrant the separation; a fact which has been confirmed by Beudant and others who have had the opportunity of examining it alive.

The general form of the Fissurellæ is that of an oblong and rather convex buckler, or of an oblong depressed cone; hollow beneath, and having the point of the vertex directed to the front of the shell, and perforated: this perforation, which serves for the passage of the water to the branchiæ and of the excrements, is occasionally nearly round; mostly of an oblong shape, in some species contracted at the center, in others widened, and the shell is always thickened around the margin on the inside, as if the edge were turned inwards. The



## FISSURELLA.

muscular impression surrounds the inside of the shell, not far from the edge; it is wider at its sides towards the front than any other part, but the anterior part itself is generally very narrow. The outside of the shell is generally marked by striæ or grooves, radiating from the vertex to the outer margin; these are mostly decussated by the lines of growth. The inner margin is mostly crenulated.

The animal of the *Fissurella* is very nearly related to that of *Emarginula*, as the shell is to the *Emarginula* itself; the fissure in the anterior margin of the latter serving for the same purposes as the perforation in the vertex of the former. One difference, however, is peculiarly observable, which is that in *Emarginula*, the vertex is directed posteriorly, contrariwise to that of *Fissurella*; for Lamarck is mistaken in speaking of the notch or fissure in the edge of *Emarginula* as posterior.

Of this marine Genus Lamarck describes but 20 species, perhaps not half the number at present known, some of which are very elegant, and one or two deserving of particular notice; for instance, the *F. Pustula* and *macroschisma*. The *F. Græca* and two or three minute species are found on our coasts; by far the greater number of species known are recent, they are thickish and strong shells, some delicately cancellated on the outside, others prettily radiated with alternating dark and light colours. A few fossil species are found in the truly marine formations above the chalk.

In our plate we have given representations of the following species:

- Fig. 1. *Fissurella picta*, Lam.  
2. ——— *crassa*.  
3. ——— *Pustula*.  
4. ——— *calyculata*, Nob.  
5. ——— *macroschisma*. *F. hiantula*, Lam.  
6. ——— *fascicularis*? Lam.

## PATELLA.



**TESTA** plerumque ovata, depresso vel subdepresso-conica, subtus concava, vertice semper antico, plerumque subcentrali, rariùs admodum marginali vel submarginali: *impressio muscularis* elliptica, anticè interrupta.



*PATELLA*, when detached from all the other genera which were associated with it under that name by Linnean authors, forms still a Genus very comprehensive in numbers, and though well characterized as a Genus, the study of it is rendered extremely difficult, on account of the variations to which the species are liable from peculiarity of position or situation. This observation is suggested by the fact, that the *P. cærulea* is extremely regular and thin when it has lived upon the leaves and stems of seaweed; and, on the contrary, irregular when attached to the roots: we have also reason to believe that a like difference of situation is the cause of the great difference in character between *P. compressa* and *P. miniata*; but we are confident that they ought to be considered as varieties of the same, for we possess specimens in which, from the vertex to about half an inch from the margin, the characters are those of *compressa*, while the remainder of the same identical specimen is indisputably a well characterized *P. miniata*: it is remarkable that Lamarck should have observed the same fact, but considers it in some measure inexplicable.

Shell generally ovate, sometimes oblong; more or less depressedly conical, rarely of a pyramidal form; concave beneath in proportion as the vertex is convex. The *apex* or *vertex* is sometimes very nearly central, always more or less anterior, very seldom marginal, or indeed nearly so; when curved, generally towards the head of the animal: a character by which *Patella* may be distinguished from all the other shells that have been associated with it.

## PATELLA.

The muscular impression, which is generally very distinct is of the same form as the shell, and placed within, about half way from the summit to the margin; it is interrupted in front, where the head of the animal is placed; becoming very much narrower, and forming only a transverse line. The outside is sometimes smooth and the margin entire; but more commonly ribbed or striated in a very variable manner from the apex to the margin, and then the margin is variously crenulated or dentated. There is no canal for the passage of water to the *branchiæ*, as there is in *Emarginula* and *Siphonaria*, for in this Genus the *branchiæ* are external, surrounding the animal.

Though these animals are endued with locomotive powers, yet they habitually remain for a long time affixed to the same spot: they are very common in all rocky places on the sea coast, frequently forming a hollow place in the rock where they are attached, and being modified in form according to the smoothness or inequalities of the rock: some species are attached to sea-weeds; all, we believe, feed on them. A great number of recent species are known, but we apprehend several, which ought to be considered as mere varieties, are published as distinct species by Lamarck and other authors: it is remarkable that they are wholly omitted in the *Encyclopédie méthodique*. Contrary to the opinion of some celebrated conchologists, we consider the *P. Cochlear* to be a true *Patella*. The English name of *Limpet* is commonly applied to the species of this Genus, of which several are common on our coasts. The more common name given to them in France is *Lepas*, the original name by which the earliest Greek writers on Natural History designated the *Patellæ*: it is their *Βαλανος*, which corresponds with the *Lepas* of modern Conchology.

The fossil species are not numerous; they occur in the great Oolite, Lias, and perhaps in the Oxford clay and Chalk marl of the secondary series; in the *Calcaire grossièr*, and probably in the London clay of the tertiary series; and also in the Crag of the Diluvian formation.

Fig. 1. *Patella melanogramma*?

2. ——— *miniata* var. in colour.
3. ——— *miniata* and *compressa* in one specimen.
4. ——— *ferruginea* jun.
5. ——— *intorta*.
6. ——— *fragilis*, Chem.

## MAGILUS.

Lam. V. p. 373.

TESTA basi in spiram brevem, ovatam, helici-  
formem, convoluta; anfractibus tribus vel qua-  
tuor, convexis, contiguis; ultimo majore in  
tubum elongatum, undato-rectum porrecto.  
Tubus, supra convexus, infrà carinatus; ad  
latera subdepressus, plicatus.

IN conformity with the intention we expressed at the com-  
mencement of this work, of giving the genera of all  
animals whose habitations have usually been called shells,  
and not regarding the important differences of the classes  
of animals who form their own testaceous covering, we  
have already proceeded to illustrate two genera of La-  
marck's *Annelides*, namely, *Galeolaria* and *Dentalium*;  
and for the same reason, although we may again excite  
the surprise of some continental authors by so doing,  
we shall now proceed to another and a very remarkable  
shell, the *Magilus* of Lamarck; which, indeed, we sup-  
pose to be formed by an animal of the nature of his  
*Annelides*; but, inasmuch, as we are totally unacquainted  
with it, and it is distinguished by some peculiarities of  
habit, we do not speak decisively to this point; but  
simply state that, from what we know of the shell, we  
judge the animal to differ, and not to affix itself in the  
the same manner as the *Annelides*; it is, indeed, from its  
situation, rather than from any other circumstance that  
this shell is remarkable, it being found enclosed in Mad-  
repores, but not attached to them in any degree, but

## MAGILUS.

living in a perforation which it has exactly suited to its volume: we are convinced that it has not, nor does it need, the means of enlarging this perforation; for when quite young, taking up its station in an hollow part of the Madreporæ, and increasing itself in size and length as the Madreporæ increases around it, it keeps its aperture even with the outer surface of the coral, and thus grows in some instances, to a considerable length. We are informed that this singular testaceous parasite is common in the Coral rocks of the Isle of France, and that its tube sometimes reaches the length of three feet.

Shell, at its base and in its young state, convolute, ovate, like a snail forming a short spire of four volutions at most: the last volution larger than the rest; and as it increases in age, prolonged into the form of an elongated, irregularly undated, straightish tube, consisting of a solid shelly substance, the greater part of the tube being filled up by the animal as it extends that part of the tube in which it resides, and formed of fibres diverging from the center towards the circumference. Upper part of the tube convex; lower part carinated; sides rather irregularly depressed, with irregular transverse folds or striæ, particularly on one side.

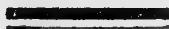
Notwithstanding Lamarck's expressed opinion that the *Serpula gigantea* of Pallas, appears incontrovertibly to be a species of this Genus; we cannot consider it as such, and in this our opinion we are confirmed by the very words of Pallas: "Longitudinaliter in rupibus crustisque corallinis exporrecti, subflexuosi et per totam longitudinem adnati esse solent. Qui *Milleporæ alcicorni* adcreverunt, ab ejusdem substantiâ vulgò penitus incrustati sunt, ut vera eorum forma conspici nequeat."

The only species we are acquainted with are recent; we have represented two, *M. antiquus* and *M. elliptecus*, while we remain unacquainted with the form of the one provisionally named *M. Peronii* by Lamarck, we can only consider it as a young specimen of *M. antiquus*.

## EMARGINULA.



**TESTA** clypeiformis, aut depresso-conica, oblongiuscula, vel oblonga; subtus cava; vertice posticè inclinato; margine antico fisso, vel emarginato. *Impressio muscularis* lateribus latior.



ONE of the genera separated by modern conchologists from the Linnean *Patella*, and established beyond controversy, because the distinguishing marks are not to be found in the shell only, but also in the animal, wherefore it may be instanced as one of the best evidences of the propriety of the observation; that wherever there is a characteristic mark of distinction observable in shells, a corresponding difference may be traced in the animal inhabitant, and at the same time as a proof that a conchological system should rather be formed from the structure and characters of the animals than of the shells. *Emarginula* is more nearly related to *Fissurella* than to *Patella*, inasmuch as its *branchiæ* are not external, and the little fissure or notch in the anterior edge is only the termination of a narrow canal, that serves the same purpose in this shell, as the perforation in the summit of *Fissurella*.

It is observable that Lamarck has placed *Emarginula* next to *Parmophorus*, without seeming to have remarked the very great resemblance of the animals to each other: we have thought ourselves justified, both by the characters of the shells and of the animals, in uniting them; this may be objected to, perhaps, on account of the great difference in general form, but we answer, that there are some species of Lamarckian *Emarginula*, one of which



## EMARGINULA.

we have figured, which approach very near to Blainville's *Parmophorus* in shape: another objection may arise from the apparent want of the anterior fissure in *Parmophorus*, but it will be seen that the anterior edge of the shell is always somewhat emarginate, while in the situation of the branchiæ, the anterior fissure in the mantle of the animal, and in the position of the vertex in the shell, they exactly resemble each other; we, therefore, consider the *Parmophori* of *Blainville* and *Lamarck*, as elongated and compressed *Emarginulæ*.

Shell clypeiform, or depressedly conical, 'more or less oblong, hollow beneath; vertex turned backwards; anterior margin slit or notched. Anterior sides of the muscular impression interrupted, expanded, not continued across the front.

*Emarginula*, even including the *Parmophori*, is not a numerous Genus; though much more so than it appears to be in *Lamarck*: the recent species are found in the seas of almost all climates; one or perhaps two are inhabitants of our own coasts. Some of them are very pretty little shells. The *Parmophorus* is the same as the *Scutum* of *Montfort*, and the *Patella ambigua* of *Chemnitz*; and in England, is commonly called the Duck's Bill Limpet; it is not a common shell.

The fossil *Emarginulæ* are scarce: they occur in the Calcaire grossier, and its contemporary strata; in the Crag of Suffolk, Essex, and Norfolk; and in the Bath Oolite: they are very elegant little fossils, particularly *Lamarck's E. clypeata*. We cannot consider his *Parmophorus elongatus* as a species of this Genus, for its vertex is anterior, as its muscular impression demonstrates; consequently, we find in it no mark of a canal at either end: it must therefore be classed with *Patella*.

Our plate represents at

- Fig. 1. *Emarginula elongata*, *Parmophorus elongatus*, *Blainv.*  
 2. ————— *brevicula*, ————— *breviculus*, *Blainv.*  
 3. ————— *fissurata*. *Patella fissurata*, *Chemn.*  
 4. ————— *elegans*. A fossil species, from Normandy.  
 5. ————— *reticulata*. *Patella reticulata*, *Chemn.*  
 6. ————— *tricostata*. ————— *tricostata*, *Humph.*



## PRODUCTA\*.



**TESTA** æquilatera, inæquivalvis, valvâ alterâ plerumque convexâ, margine inflexo, subrectè producto; alterâ planâ, vel externè concavâ, margine reflexo: margine cardinali transverso.



A GENUS of fossil shells peculiar to the strata of secondary formation, and to a certain extent characteristic of them, and particularly of the carboniferous or Mountain Limestone. The shells which compose it appear to have been first brought into notice by Martin, in his *Petrificata Derbiensia*, he called it *Conchyliolithus Anomites*, and defined it as one of his divisions of the Genus *Anomia*, and correctly so, for there is no other Linnean Genus to which it could be referred: later authors have, however, seen the propriety of separating it from *Anomia*, as a well marked and very distinct Genus, belonging to the Lamarckian Brachiopoda, if we may be permitted to form our judgment from the shell alone, for it is one of those genera of which a recent specimen has never been seen, we cannot therefore hope ever to have an opportunity of examining the animal. The shell itself is rendered remarkable by the manner in which the anterior margin is produced beyond the part inhabited by the animal, a circumstance, on account of which, Martin gave to one species the specific appellation of *productus*; a bad name, because equally applicable to every species of the Genus, and therefore, if it could have been applied as a generic name, would

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\* We prefer retaining this name, though not strictly correct, changing however its termination to make it accord with *Concha* or *Testa*, understood. *Producta* is already adopted by Conybeare. (See Conybeare and Phillips's *Outlines of the Geology of England and Wales*.)

## PRODUCTA.

have been preferable to any other: our classical friends inform us that this is incorrectly done by Sowerby, in his *Mineral Conchology of Great Britain*; by altering its termination, one objection at least will be removed. We would willingly have substituted a preferable name, had any been suggested which would have unexceptionably characterized the Genus.

This singular bivalve is equilateral and inequivalve; one valve being generally convex, very rarely rather flat, with its anterior edge rounded, very thin, turned downwards (or inwards), and produced into the form of an irregular cylinder, and a little expanded towards its lower edge; the other valve is generally flat, or a little concave on the outside, with its anterior margin turned backwards, so that its inner side lies against the inside of the concave valve. The cardinal or posterior margin is transverse, straight and linear, and sometimes continued so far on both sides as to render the shell subalate. We have never seen the remains of any ligament, nor do we suppose that when the animal was living its valves were united by any. It is very seldom that the inside of either valve has come under our observation, but in some casts, and in a specimen of a flat valve from the Transition Limestone of Dudley, there are indications of internal processes near the hinge. The texture of the shell is exactly like that of the other Brachiopoda: it is granular within, and frequently spinose on the external surface.

The fossils of this Genus occur principally in the Mountain Limestone; they are also found in the Transition Limestone of older date, and in the Steaschist\* of Snowdon, (see Phillips, in *Annals of Philosophy*;) as well as in Magnesian Limestone at Breden, near Derby; but in this latter they appear to be rare, as they are not mentioned by Conybeare and Phillips. About 20 species are figured in *Mineral Conchology*.

Mr. König obligingly informs us that the names of *Polyginglymus* and *Pyxis* have formerly been applied to a species of this Genus: but unfortunately both of these names have been preoccupied.

Fig. 1. *Producta Martini*.

————— *depressa*, Nobis.

————— *antiquata*.

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\* It would have been more correctly termed *Steatoschist*.

## MELANIA.



Lam.



**TESTA** turrita vel subturrita, epidermide corneâ indutâ; *spirâ* plerumque elongatâ, interdum brevissimâ; *aperturâ* integrâ, ovali vel oblongâ, supernè acutâ, infra rotundâ, effusâ vel canalem indistinctum efformante, *peristomate* simplice, acutiusculo. *Operculum* corneum, spirale, anfractibus duobus vel tribus.



THE genera *Helix*, Linn., *Buccinum*, Müller, and *Bulimus*, Bruguière, have successively been the receptacle of one or two of the shells which compose the present Genus, which Lamarck at length separated from all others under the name of *Melania*. It is a Genus of river or fresh water shells, related to *Ampullaria* and *Paludina*, and apparently forming the transition from the shells with entire apertures, such as *Paludina* to those which are characterized by a notch at the base, such as *Potamides* of Brongniart, *Melanopsis* of d'Audebard, and *Pirena* of Lamarck. We have never seen the animal, but the shell is well distinguished by the following characters:

Shell turrited or subturrited, spire frequently elongated, acute; aperture entire, oval or oblong, generally pointed at the superior extremity, rounded below and at its junction with the smooth incurved columella forming a sort of indistinct canal. The edge of the lip is not thickened nor reflected, but simple and sharpish. In a few instances the upper part of the aperture is separated from the last volution. Sometimes the shells of this

## MELANIA.

Genus are nearly smooth on the outside, but they are more frequently remarkable for various grooves, granulations, tubercles, and even sharp points; and these are for the most part more strongly marked at the upper part of the volutions, though sometimes extending over the whole. The outside, of the recent species, is also covered with a generally strong, horny, dark brown or black, sometimes olivaceous, brownish or greenish epidermis; and the aperture is closed with an oblong, horny, spiral, not always smooth operculum, of only two or three volutions. The *Melaniæ*, in common with other fresh water shells, are frequently eroded at the most prominent parts, so much so, that the spire is sometimes decollated, and the shell remains of less than half its natural length.

The Genus to which *Melania* seems most nearly related, in respect of the characters of the shell, is *Turritella*; the form of the aperture, which is nearly round in the latter, and the nature of the epidermis will easily distinguish them when recent: this last mentioned character is, however, of no avail in the fossil species. Most of the recent *Melaniæ* are from the rivers of warm climates.

The fossil species occur in the fresh water formation, and probably in some others, but they are very abundant in that *ambiguous* bed, commonly called the "upper marine." Headen Hill, in the Isle of Wight, and Charlton, near London, furnish great numbers of a few species. Some other sorts abound in analogous beds in the neighbourhood of Paris, and in Normandy. Whether the shells called *Melaniæ*, *striata*, Mineral Conchology, tab. 47; *Heddingtoniensis*, tab. 39, *lineata*, tab. 218; and some others from secondary strata, should be considered as true *Melaniæ* or not, we do not undertake to decide, the determination of this point involves considerations that are foreign to the object of this work, and too closely connected with the nature of the strata in which they occur, for us to venture to advance any opinion.

In our plate we have given representations of

Fig. 1. *Melania Amarula*.

2. ———, a new species? from the Isle of France?
3. ——— *subulata*.
4. ——— *costellata*.
5. ——— *marginata*,

## MELANOPSIS,

*D' Audebard.*

—◆◆◆—  
Melanopsis et Pirena, Lam.  
—◆◆◆—

**TESTA** oblonga, fusiformis, vel conico-cylindracea, apice, (nisi erosione perierit) acuto; *spirâ* anfractibus 5 ad 15, ultimo plerumque maximo; aperturâ oblongâ vel ovali, supernè acutâ, infra emarginatâ; *columellâ* contortâ, callosâ, supernè incrassatâ, subtus subtruncatâ, *labio externo* interdum profundè emarginato. *Operculum* corneum, parvum, spirale.



“THE Genus *Melanopsis*,” established by M. le Baron d’Audebard de Ferussac, in 1807, “is one of the most interesting of molluscous animals, on account of the importance of facts proved by its fossil species, in connection with the history of the tertiary formations. It is not less worthy of attention in a zoological point of view, because it shows a sort of transition from the operculated to the semi-operculated *Pectinibranchia*, that is, from those *Pectinibranchia* whose shells have an entire aperture without a canal at its base, and whose operculum entirely covers the aperture, to those the base of whose aperture forms a more or less distinct canal, destined to receive a fold of the mantle, which conducts the water to the branchial cavity, and whose operculum is neither so large nor of the same form as the aperture.”\*

We are not aware that any of the *Melanopsides* are marine, for all the recent species occur either in rivers or lakes, and yet most of the fossil species are found in beds

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\* De Ferussac in the “Memoires de la Société d’histoire naturelle de Paris,” p. 133.

## MELANOPSIS.

that are considered by geologists (in this country) to be of marine formation: we know not what degree of credit is to be given to the assertion of a celebrated author, "that the greater number of the genera of the Pectinibranchia might formerly have contained species peculiar to rivers and lakes as well as to the sea; but this we do know, that wherever the fossil *Melanopsides* are found, they are accompanied by many other species of genera that at present only live in fresh water, and therefore we think they ought to be considered as characteristic of the formation in which they occur.

Shell oblong, fusiform or conico-cylindrical, pointed at the apex when complete, but very frequently decollated and eroded; *spire* with from 5 to 15 volutions, the last often forming two-thirds of the whole shell; *aperture* oblong or oval, pointed at its upper parts; *columella* twisted, solid, callous, separated from the exterior margin at the base by a notch; the callosity spreading over the last volution but one, thicker near its union with the upper extremity of the aperture, where the outer lip is sometimes deeply notched: operculum spiral, horny, not completely closing the aperture.

The shells which form this distinct Genus have been placed by Linneans in *Buccinum*, *Murex*, and *Strombus*; Olivier united them to *Melania*, and Bruguière placed some of them in *Bulimus*, and others in *Cerithium*. We accord with De Ferussac in considering the the two first species of Lamarck's *Pirena* as true *Melanopsides*, both on account of the agreement in the characters of the shells as well as the animals. (His *P. aurita* and *granulosa* belong to *Melania*.)

The *Melanopsides*, as far as we know at present, are confined to the continents of the old world: several of them are european, but no one has yet been found recent in Britain: those which Lamarck called *Pirenæ* are peculiar to Madagascar.

Our plate contains representations, at

Fig. 1. Of *Melanopsis atra*, d'Audebard; *Strombus ater*, Linn.; *Pirena terebratis*, Lam.

2. ————— *buccinoides*, d'Aud.; *M. lævigata*, Lam.; *Melania*, Olivier.

3. ————— *costata*.

4. ————— *acicularis*, d'Aud.; *M. Audebartii*, Prevost, from the Thermal Springs of Weslau, near Vienna.



## UMBRELLA.

Lam.

TESTA externa, orbicularis, subirregularis, planulata, supernè convexiuscula, albida, vertice minimo, subcentrali; marginibus acutis; internâ facie subconcavâ, disco centrali, calloso, colorato; *impressione musculari* irregulari, continuâ.

APPARENTLY very distinct from the other patelliform shells, both in the characters of the shell and those of the animal; De Blainville, who alone has examined the animal, must have been deceived by some accidental circumstance which detached the shell from its back and turned it downwards, as we think Lamarck has satisfactorily demonstrated: the name of *Gastroplox*, which De Blainville gave to the animal in consequence of this circumstance, must therefore be abandoned: and his idea that the creature was contained between two valves, or between a single valve and the rock, must fall to the ground. In other respects De Blainville's observations are interesting and satisfactory; he has shown that the animal is nearly related to the *Aplysiæ*. Its shell, which is placed on the back and serves as a protection for the viscerae, is orbicular, rather irregular and flat: above rather convex, whitish, with a very small, nearly central vertex; its edges are sharp; the lower or inner surface is concave, with a central, callous disk, which is most commonly of a yellowish or fulvous colour: the muscular impression continuous all round the inside of the shell, at about half way between the margin and the vertex; it is very irregular.

We are only acquainted with a single species of this Genus, which is commonly called the *Parasol Limpet* in



## UMBRELLA.

England, and *Parasol Chinois* in France; Lamarck mentions two, one from the Isle of France and the Indian ocean, and the other from the Tarentine gulf: the character by which he distinguishes them appears to us scarcely sufficient, notwithstanding which they may be truly distinct species; we have never seen the latter; nor have we ever heard of any fossil species.

The specimen we have figured is a small one; its diameter is sometimes from 5 to 6 inches, and the animal is much larger than the shell.

Since writing the above we have examined the identical specimen which M. De Blainville described, in the British Museum, and we have been so fortunate as to detect the cause of his error, at the same time we have proved the accuracy of his anatomical description; the circumstance by which he has been deceived, has been the displacing the shell from its original situation on the back of the animal, and fixing it to the under side of the foot, where it now adheres, not by the muscular fibres of the foot, but by a kind of cement artificially interposed.

## SERPULA.

—◆◆—  
Serpula, Spirorbis, Vermilia et Vermetus, Lam.  
—◆◆—

**TESTA** tubulosa, cylindracea, posticè attenuata; vel in spiram productam seu orbicularem, discoideam, convoluta vel irregularis; interdum infernâ superficie planulatâ omnino fixa, interdum repens, spirâ non distinctâ; interdum partim erecto-undata, variè contortuplicata; rarè admodum pœnè libera: *aperturâ* plerumque rotundâ, margine vel simplici, vel dentibus seu angulis variè armato. *Operculum* testaceum vel corneum, orbiculare, formâ pervariabili.

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THE differences which have induced Lamarck to separate the Genera *Spirorbis* and *Vermilia* from *Serpula* depending upon circumstances altogether variable, cannot be considered as sufficient reasons for removing from that Genus the little testaceous coverings of these *Annelides*: but the circumstances on account of which he has removed *Vermetus*, not only from *Serpula* but from the family itself, require a more critical examination, inasmuch as these reasons have induced him to arrange it with his *Scalariens*. Let it be observed that Adanson, from whom Lamarck adopted his *Vermetus*, has included with it several others that evidently belong to Lamarck's *Serpula*, only describing the animal of one: it will next be seen that in many of its most important characters the animal so described by Adanson accords exactly with that of *Serpula*: and then that both his description and figure are in other

## SERPULA.

respects very vague and indeterminate: seeing moreover that the shell differs in no material point from that of *Serpula*, we have thought it best to unite the whole together under the old appellation: at the same time we will point out the particular marks by which Lamarck has distinguished them into *four*, we might say *five* genera, for we have already shown that *Galeolaria* might with propriety be united to *Serpula*. The peculiarities of Lamarck's *Serpula* are, *irregularly* convoluted, grouped or solitary tubes, with a *round* very simple aperture: the shell of *Spirorbis* is twisted into an orbicular discoidal spire, the lower surface of which is flat and attached; its aperture is also orbicular: the *Vermiliæ* are attached by the *side* of their shell, repent, with a round aperture whose margin has from one to three teeth: *Vermetus* is known by its having the commencement of its shell formed into a regular pointed spire, attached at its smaller end; in other respects it is like *Serpula*. Our *Serpula*, uniting the whole of these, may be characterized as follows:

Shell tubular, cylindrical, increasing gradually in size, either forming a regular, pointed, or an orbicular, discoidal spire, or irregularly convoluted: sometimes attached by its flattened lower surface, sometimes repent without a distinct spire, sometimes only attached by a part of its shell, the remainder being somewhat irregularly erect and undulated and variously twisted; and very rarely almost free: aperture for the most part round, its margin either simple or having one or more teeth or angular prominences, according to the number of ridges outside the tube: operculum shelly or horny, orbicular, and very variable in its form; the outside of these shells is also exceedingly variable, being either annulated, imbricated, ribbed, corrugated, subspinose or smooth. There are also some other variations to which the *Serpulæ* are subject, which might have formed the foundations of new genera, with as great a degree of propriety as any of those separated for the reasons we have detailed above: the principal of these varieties that we recollect are, those with an expanded aperture; those with a very contracted opening, like a narrow fissure; those which spread laterally on both sides wherever they are attached; and those which form a groove in the shell or other substance to which they are attached, and lie as it were

## SERPULA.

imbedded in it: there are also some which, after forming a regular discoidal spire at first, continue their shell in a straight regular line. The *Serpulæ* being irregular shells, most of the variations to which they are subject, are caused by peculiar circumstances depending upon the substance they adhere to; thus the *Spirorbes*, which generally are found attached to smooth and even surfaces, are comparatively regular; the *Vermeti* also, which are found imbedded in sponge, having a soft and yielding substance to fix themselves to, grow freely, and produce a regular pointed spire at first; but as the sponge increases rapidly, the *Vermetus* ceases to form a regular spire, because, in order to obtain nourishment, it is compelled to keep its aperture protruded beyond the sponge, and this it is only able to accomplish by an irregular vermiform increase.

Like the *Cirripedes*, the *Serpulæ* abound in almost every situation that is at any time covered by the sea; they are found attached to every thing, from the firm rock and the sea weed that grows upon it, to sea animals, the most rapid in their motions, such as the Lobster and Sea Crayfish: in some situations where they are not subject to interruption, they form patches of great thickness and extent: Adanson speaks of having seen the rocks in some places of the Island of Goree covered with a crust several inches thick and more than twenty feet square.

*Serpula* is to be distinguished from *Siliquaria* by the longitudinal fissure of the latter, which continues the whole length of the shell, but of which *Serpula* is destitute: from *Teredo* it may be known by its tube being open only at one end, and by its *simple* round aperture; that of *Teredo* being more or less distinctly double and closed imperfectly by two spatulate or pennate pieces, while *Serpula* has a regular circular operculum.

Of fossil species there are many, and they occur in most strata, but little is known of them, so little that we cannot distinguish any particular species as characterizing any strata, except one or two that appear to be peculiar to one bed of green sand and one of Lamarck's *Spirorbes* common in the chalk. The tertiary beds have many very interesting and fine species.

Our plate represents, at

## SERPULA.

Fig. 1. *Serpula cochlearia*, Defr. a fossil species from the *Calcaire grossier*, at Orglandes.

2. ——— *triquetra*; *Vermilia*, *Lam.*; a. b. c. opercula of the same of various forms, magnified: these have been described as *Patellæ*.

3. ——— *Vermetus*; *Vermetus lumbricalis*, *Lam.*; a. its operculum.

4. ——— a fossil species from Touraine, very slightly different from the last.

5. ——— *glomerata*.

6. ——— *dentifera*? *Lam.*

7. ——— *cristata*.

8. ——— *ornata*, a beautiful species attached to a *Cardita*.

9. 10. ——— *Spirulæa*? *Park. Intr.* frequent in the Chalk. *Spirorbis*, *Lam.*

## CASSIS.



TESTA ventricosa, seu iufata, spirâ brevi. Apertura longitudinalis, angusta, in canalem brevem, subitò reflexum desinens. Columella transversè plicata vel rugosa. Labium externum incrassatum, reflexum, sæpissime internè dentatum.



ALMOST every person who knows what a shell is, has seen and is acquainted with the *Helmets*, which are rendered in general remarkable on account of their size; and, as being common and handsome, are used as ornaments. They formed a part of the Linnean Genus *Buccinum*, but taking the Common Whelk, *Buccinum undatum*, as the type of that Genus, they certainly differ very materially, particularly in the form of the aperture, which is narrow and dentated on both sides, in the thickened and reflected outer lip; in the inner lip being expanded over the last volution and in the reflected canal. Some of the Lamarckian *Dolia* approach nearer to the *Cassides* than the *Buccina*, but their want of the reflected canal will also distinguish them; his *Cassidariæ* have the same general form, but are characterized by a canal not reflected, though in a slight degree ascending: it is to *Nassa*, which Lamarck formerly separated from *Buccinum*, but which he has recently reunited to it, that *Cassis* appears to us to be most nearly related, both as respects the form and general characters of the shell and some of the habits of the animal: for they both appear to belong to that family of predaceous Trachelipodes that bury themselves in the sand in search of their prey; for Lamarck tells us of the *Cassides* "that the shells live in the sea at a distance from the shores and upon sandy bottoms, where they bury themselves in the sand;" and we know of the common *Buccinum reticulatum*, Linn. and Lam.,\* from the actual

\* In conformity with Lamarck's definition this shell ought to be placed with the *Nassa*.

## CASSIS.

observation of some of our friends, that it is frequently found buried in the sand in company with some of the common *Mastræ*, upon which it feeds. The state of our knowledge not permitting us to unite *Nassa* with *Cassis*, though we think it must be separated from *Buccinum*; we shall be content with describing *Cassis*, and point out the characters in which *Nassa* differs from it.

Shell ventricose or inflated, frequently of a subtrigonal form, the spire being generally very short. Aperture longitudinal, narrow, in some species almost equal in length to the whole shell, in others proportionally wider and the spire being at the same time more produced, the aperture can scarcely be considered as elongated. The base of the aperture is produced into a short canal, which is suddenly turned backwards, the inner edge of which is rather acute and forms the twisted columella, the outside of which is generally transversely plicated or rugose. The outer lip when complete is thickened and turned outwards, in many species forming a varix at the completion of each turn of the spire; and it is frequently also turned inwards and dented or grooved at its edge or inner part. The inner lip also is thickened and expanded over the lower part of the last volution, frequently forming a flat expanded disk, extended beyond the edge of the last varix, where varices are formed, and in those species where no varices are produced till the full growth of the shell, only spread over the ventricose part of the volution.

The circumstances in which *Nassa* differs from the above, are, in having generally a longer spire; a shorter, scarcely longitudinal aperture; the canal, though reflected in the same manner being shorter, and scarcely, if at all, separated from the back of the shell; in never forming any varix until arrived at its full growth; and in having its inner lip seldom so much expanded.

The Cassides are numerous, frequently knobbed, particularly at the upper part of the volutions; variously grooved, striated, cancellated, decussated, &c. They are fine shells, and mostly inhabitants of tropical climates. The fossil species are not common, they belong to the newer or tertiary formations.

We have never seen the operculum belonging to this Genus.



## LITHODOMUS.

—◆◆—  
Cuv.  
—◆◆—

**TESTA** transversa, æquivalvis, regularis, elongata, (valvis clausis) cylindrica, extremitatibus pariter rotundatis, latere antico brevissimo; epidermide fuscâ, corneâ induta: umbonibus anticis, pœne prominulis. *Cardo* linearis, edentulus. *Ligamentum* lineare, internum, parte minimâ externè conspicuâ. *Impressiones musculares* duæ, antica minima, postica majuscula, oblonga.

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SEPARATED from the *Modiola* by Cuvier, (Regne Animal II. p. 471), on account, as its name implies, of its living in stones, but reunited to them by Lamarck, who, notwithstanding their peculiar and different habits, discovers in these shells only true *Modiolæ*. Now, as we are of opinion that nature has given to each animal an organization precisely suited to its habits, or in other words, that the habits of each animal are always the consequence of its peculiar structure, and knowing as we do that the *Lithodomi* are constantly terebrating animals, we accord with the first named author in separating them from the *Modiolæ*; and we are the more disposed to do so, because they may also be easily distinguished by the peculiarities of their form; but we are at a loss to conceive how the accurate Cuvier could have made the following remark upon the *Lithodomi*: “ Ils se suspendent d’abord aux pierres, comme les moules communes, mais ensuite ils les percent pour s’y introduire, et y creusent des cavités, dont ils ne

## LITHODOMUS.

sortent plus. Une fois qu'ils y ont pénétrés, leur byssus ne prend plus d'accroissement." We cannot imagine that this remark has been made from actual observation, because we believe it to be contrary to the nature of the animal to be at one time attached by a byssus, and not at another; and, moreover, we have ourselves seen *Lithodomi* not more than one-eighth of an inch in length, in as completely formed perforations as the fuller grown specimens: the animal itself has never come under our observation, but as far as we dare guess from circumstances in the shells, and the calcareous beaks which they often form at their smaller end and outside the epidermis, they must approach more nearly in form to those of the *Pholas*, *Saxicava*, *Petricola*, and other terebrating animals than to those of the *Mytili*.

Shell transverse, regular, equivalve, elongated; when the valves are closed, cylindrical; both ends rounded; anterior end very short; covered on the outside with a strong, horny, generally dark brown epidermis. Umbones anterior, scarcely prominent. Hinge linear, without teeth. Ligament linear, internal; a very small portion to be seen externally. Muscular impressions two, indistinct; anterior very small, posterior rather large, oblong.

We have said above that the general form of the *Lithodomi*, when the valves are closed is that of an elongated cylinder, but we might add that the hinge line generally makes a more or less obtuse angle with the posterior margin, and that the perforation they form in stones, madrepores, &c. is very nearly of the same shape as the shell; it being considered, moreover, that these shells are covered with a smooth, horny epidermis, it will appear impossible that they should form the cavity in which they dwell by terebrating: is it not then reasonable to conclude that they are possessed of a solvent fluid, which, in combination with the sea water, produces the cavity by a chemical action.

The type of this Genus is the *Mytilus lithophagus* of authors, which is very common in the Mediterranean, West Indies, and in all Coral rocks. Of the recent species that are known, and which are very few, we have not any on our own coasts.

The fossil species, which abound in the great Oolite,

## LITHODOMUS.

as well as in the Coral rag, and Pisolite, and are also found in the tertiary beds of marine origin, are very common in this country; they have been called *Fistulanæ*, (but improperly), owing to a mistake caused by the decomposition of the madrepore in which they have dwelt, around them, leaving them apparently included in an echinated clavate case.

Besides the common species, we have represented a small specimen of fossil madrepore from the great Oolite, showing several specimens of *Lithodomi* inclosed in the above mentioned cases, and also one with a calcareous deposition upon the posterior end, in the form of the beak of a Crossbill.

Fig. 1. & 2. *Lithodomus Dactylus*, Nob.

3. & 4. ———— *caudigerus*.

5. ———— a fossil species in a madrepore, from the great Oolite.



## CASSIDARIA.



Lam.



**TESTA** ovalis, vel oblonga, plerumque ventricosa: anfractu ultimo magno, *spirâ* brevi: *aperturâ* longitudinali, subelongatâ in canalem recurvum, subascendentem, ad basim desinente: *labio externo* incrassato, reflexo; *interno* expanso, collumellam obtegente, infra libero.



THE present Genus has been separated from the Linnean *Buccinum*, principally in consequence of the peculiar form and characters of the shell, for we doubt whether the animal has ever been submitted to the examination of the scientific; though, if we may form our opinion from the apparent affinity of the shell to *Cassis*, its animal will prove to be nearly allied to that of *Buccinum*; the general resemblance that the shell bears to *Cassis*, has most probably obtained it the name of *Cassidaria*. The greatest difference between these two genera consists in the canal at the base of the aperture of the latter not being abruptly recurved. *Dolium* also approaches it in general form, but may always be known from it by its short, scarcely prominent canal. It will be observed that we have nearly followed Lamarck's definition of this Genus, waiting for such light as may be thrown upon it and its cognate genera by the knowledge of their animals. We have, however, some doubt about the propriety of considering the Linnean *Strombus Oniscus* as a species of *Cassidaria*, the type of which is *Buccinum echinophorum*, Linn.

## CASSIDARIA.

The general form of the shells of this Genus is oval or oblong, and they are most commonly ventricose, the last volution being large and by far exceeding the others in size; the spire is short, and the aperture longitudinal, rather elongated and terminating at the base in a recurved canal, turning upwards when the shell is laid on its aperture. *Outer lip* thickened, reflected, often dentated within; *inner lip* expanded, covering the lower part of the last volution and columella, but standing free from it at the base just above the canal. A thin horny epidermis covers the outside of the shells when living, and in good condition; but this seldom remains when they come into the market. Its operculum we have never seen, though we have no reason to doubt its having one, and that it is thick and horny.

The recent species of this Genus are not numerous, they are mostly grooved and tuberculated on the outside; Lamarck mentions that the expanded inner lip is generally tuberculated, granular or rough, but we have omitted this in our definition of the Genus, because it is not actually true of several of the more common species, and because there is, as we have before mentioned, some reason to doubt the propriety of retaining his *C. Oniscus*, which shows this character most strongly, among the *Cassidariæ*. Of fossil species there are very few, they occur in the tertiary beds; one very elegant species, the *C. carinata*, is common in the *Calcaire grossier* near Paris; it is also found in the London clay, and the contemporaneous stratum of Piacenza.

Fig. 1. *Cassidaria, echinophora*.

2. ——— *Tyrrhenum*.

3. ——— *carinata*.

## CALYPTRÆA.



**TESTA** conoidea, vertice subcentrali, imperfecto; basi plus aut minus regulariter orbiculatâ, integrâ, acutâ. Cavitas appendice laterali; interno, adnato, vel cyathiformi, vel convolutolinguiformi, vel septum spirale efformante.



PART of the Linnean *Patellæ* constitute the Lamarckian Genus *Calyptræa*, which, with several other very different genera, such as *Emarginula*, *Fissurella*, *Pileopsis*, including *Hipponyx*, forms his family of *Calyptraciens*. Although the animal is unknown, he thinks, judging from the inner part of the shell, that it cannot be related to that of *Patellâ*; and that the internal appendage is an indication of structure approaching to that of *Trochus*, and concludes that the *Patella trochiformis* is better placed among the *Trochi* than in this Genus: we must, however, beg leave to differ from him, and consider the *P. trochiformis* as a decided *Calyptræa*, inasmuch as *the spiral inner lip is entirely covered by the animal*, and as it has *no operculum*. In considering the characters of this Genus, we felt some repugnance to the union of shells whose inner lips assume so many different forms under one generic name; but an examination of a great number of species has convinced us that it would be impossible to separate them, unless, indeed, we were to constitute a particular Genus for every variation in form, in which case we think the number of genera would be unnecessarily augmented. *Calyptræa* and *Crepidula* ap-



## CALYPTRÆA.

proach each other so nearly, that we had hesitated to separate them; the principal differences consist in the apex of *Crepidula* being lateral or nearly so, and in the internal appendage forming a nearly straight septum across the aperture, but it is rather difficult to say at which particular species Calyptræa should end, and *Crepidula* should begin. With respect to its place in the system, we are disposed rather to accord with Cuvier in considering it as more nearly related to the *Sigareti* and *Buccina*, than with Lamarck in placing it near the *Patellæ*, or in supposing that, "here the spiral shells with an entire aperture commence and form a particular series as a lateral branch."

Shell generally in the form of a more or less obtuse cone, with a nearly central, imperforate vertex, and the base more or less regularly orbicular, entire and sharp-edged. Cavity inferior, furnished with a lateral, internal appendage, very variable in form: in some species, as for instance *C. deformis*, (a fossil from Bordeaux) this appendage is only a small irregularly triangular piece attached by its longest side to the inside of the shell; in these the inner lip may be considered as reflected at its upper part upon itself, without forming an umbilicus; in others the appendage taking its rise, and being fixed only near the summit, forms a kind of tongue increasing in width, and having both its edges turned towards the middle of the shell: in others again, this appendage forms a more or less distinct cup, the inside of which is analogous to the umbilicus in other shells, and it is formed by the reflection of the upper part of the inner lip without its being at the same time depressed upon itself: in a fourth division of this Genus, which most nearly approaches the *Crepidulæ*, this appendage is a spiral plate, reflected at the upper part so as to form a small umbilicus. In many species a strongly marked muscular impression is observable just above the fold of the inner lip; in others it is placed upon the appendage, or outside the inner cup itself, but never within the umbilicus, or inner cup: in those which have a single triangular laminar appendage, it is partly placed on it and partly above it. These shells are generally thin; though sometimes remarkably thickened by circumstances attending their growth. The outside is often smooth, more frequently

## CALYPTRÆA.

sparingly covered with small muricated points, very rarely spinose, sometimes with radiating striæ and ribs, and sometimes with nearly concentric striæ. A thin epidermis overlies the whole when in perfect condition, but this is seldom seen in such specimens as are brought into commerce.

The Linnean *Patellæ equestris*, *Chinensis* and *Trochiformis*, are the types of this marine Genus, the species of which are not very numerous; they are commonly attached to large shells, stones, &c. and as they generally remain stationary, they are mostly rather irregular, and often covered with ridges and other prominences that are not characteristic of them, but are caused by the inequalities of the surface to which they have been attached, and by which their form is modified. One recent species, commonly called *Patella Chinensis*, is an inhabitant of our shores, but they are mostly brought from the South Seas, and the American coasts: that commonly called the *cup and saucer Limpet* is one of the most interesting and singular, it is from the South Seas: we are obliged to Mrs. Mawe for the loan of the fine specimen we have figured. Among the fossils which belong to the tertiary formations, there are two or three very elegant species; the London Clay and its contemporaneous beds contain some species in great abundance.

We have given two plates of this Genus, in order to shew the several variations in form to which the internal appendage is subject.

Fig. 1. *Calyptræa deformis*, Defr. a fossil from Bordeaux.

2. ——— *equestris*.
3. ——— *Extinctorium?*
4. ——— *spinosa*.
5. ——— *imbricata*, Nob.
6. ——— *Tectum Sinense*.
7. ——— *spinosa*, var.?
8. ——— *Pileus*. *Trochus Pileus*, Lam.
9. ——— *dilatata*, Nob.
10. ——— *Laumontii*, a fossil species occurring in the London clay, and *Calcaire grossier*.

1999

1. The first of these is the fact that the majority of the population of the United States is now living in urban areas. This is a result of the process of urbanization, which has been going on since the beginning of the 20th century. The process of urbanization is the movement of people from rural areas to urban areas. This is done for a variety of reasons, including the search for better living conditions, the desire for education, and the need for employment. The process of urbanization has led to the growth of large cities and the decline of small towns. This has had a significant impact on the way we live and work. For example, it has led to the development of new technologies and industries, and it has changed the way we think and behave. The process of urbanization is still going on, and it is likely to continue for many years to come. This means that we need to be prepared for the challenges that it will bring. One of the main challenges is the need for housing. As more people move into urban areas, there is a need for more housing. This can be met in a variety of ways, including the construction of new housing and the renovation of existing housing. Another challenge is the need for transportation. As more people live in urban areas, there is a need for more transportation. This can be met in a variety of ways, including the construction of new roads and the development of public transportation systems. The process of urbanization is a complex one, and it is one that we need to understand if we are to meet the challenges of the future. It is a process that has shaped the world we live in, and it is one that will continue to shape the world for many years to come.

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1. The first step in the process of identifying a problem is to define the problem. This involves identifying the symptoms of the problem and determining the scope of the problem. Once the problem has been defined, the next step is to identify the causes of the problem. This involves identifying the factors that are contributing to the problem and determining the underlying causes. Once the causes have been identified, the next step is to develop a plan of action. This involves identifying the steps that need to be taken to solve the problem and determining the resources that will be needed to implement the plan. Finally, the last step in the process is to implement the plan and monitor the results. This involves putting the plan into action and tracking the progress of the solution. Once the problem has been solved, the final step is to evaluate the results and determine if the solution was effective. This involves comparing the results of the solution to the original problem and determining if the problem has been solved. If the problem has not been solved, the process may need to be repeated.

## CREPIDULA.



**TESTA** transversim elliptica, ovata, vel oblonga, dorso plerumque convexo, subtus cava; *spirâ* aut nullâ aut brevissimâ, *vertice* ad marginem subobliquè inclinatâ. *Labium internum* complanatum, acutum, edentulum, latum, laminam horizontalem, aperturam partim claudente, efformans; *externum* acutiusculum, integrum. *Impressiones musculares internæ.*



A GENUS separated by Lamarck from the Linnean Patella, and named Crepidula from its resemblance to a slipper. Lamarck thinks that perhaps among the testaceous *Gasteropodes*, no Genus is so eminently distinct as the *Crepidula*, not only in respect to the animal, but also to the shell. We regret that we are compelled to differ in opinion from so celebrated a conchologist and to state as our conviction, that it is very nearly related to *Calyptræa*, so that it *justly* assumes the place assigned to it by Lamarck and must follow *Calyptræa* closely, but it cannot be considered as connected with Trochus. We have already, in describing the last named Genus, pointed out the marks of discrimination between the two genera: and in treating of *Navicella* we have shown wherein that differs from the present Genus, so that we may now proceed to describe *Crepidula*; the following are its characters: shell transversely elliptical, oblong or ovate, very rarely almost orbicular, the outside being almost always convex, though sometimes concave, but as the animal remains generally stationary for a considerable period, the form of the shell is naturally modified by that of the rock or other substance to which it adheres, so that it may properly be considered as an irregular shell. The spire, if indeed it can be called a spire, whenever there is

## CREPIDULA.

any volution, is extremely short, and its point or vertex is obliquely inclined towards the margin. The under side is generally concave, and the inner lip forms a broad, flattish, sharp-edged, toothless, horizontal plate, which about half covers the aperture. Outer lip rather sharp-edged, entire. Muscular impressions within. The outside of the shells of this Genus are for the most part covered with a thin epidermis, under which are the lines of growth parallel to the edges of the shell, and transverse striæ or grooves, sometimes muricated with short spines and imbricated scales. Those species which are nearly orbicular approach very nearly to the *Calyptrææ*. Neither of these genera have any operculum.

Of recent species the number with which we are acquainted is very limited; we have represented one, the finest we have seen, with which we are obligingly favoured by W. J. Broderip, Esq., it forms part of his splendid collection, and is remarkable for the contrast between the brilliant dark colour of the inside and the onychine whiteness of the septum.

Several fossil species are found in the tertiary formations, as well as in those of more recent origin: it is however desirable to distinguish the little fossil shell published in the Dictionnaire des Sciences Naturelles by M. De France under the name of *Crepidula Altavillensis*, which, if it be not properly arranged under *Neritina*, where we have placed it, should be considered as a species of our *Pileolus*, to which indeed a similar fossil has already been added by M. Deshayes in his account of this latter Genus published in the Annales des Sciences Naturelles for February, 1824, and which Genus it appears he had intended to call *Tomastoma*.

- Fig. 1. *Crepidula fornicata*.  
 2. ——— *Onyx*, Nob.  
 3. ——— *costata*, Nob.  
 4. ——— *aculeata*. *Patella auricula*, Gm.  
 5. ——— *dilatata*.  
 6. ——— *unguiformis*.  
 7. ——— *Porcellana* ?

## PHOLAS.



**TESTA** transversa, oblonga, æquivalvis, inæquilatera, utroque latere hians, hiato antico plerumque maximo, interdum ferè clauso; valvis accessoriis difformibus sæpius instructa; *Cardo* utriusque valvæ dente longo curvo, infra marginem umbonalem reflexum prominente. (*Ligamentum nullum, aut minnimum, internum.*)



*PHOLAS* and *Gastrochæna* together constitute Lamarck's family of *Pholadaires*, though he appears to have entertained some doubt of the propriety of thus uniting those two genera into one family, and we have endeavoured formerly to show that *Gastrochæna* belongs rather to the *Tubicolées* than to the *Pholadaires*. We may now perhaps without impropriety propose the following question; Would it not have been more consistent with the rules of association apparently entertained by Lamarck if he had united the *Petricolæ*, *Venerirupes*, and other terebrating Conchifera, which do not form a shelly tube, with *Pholas* in one family, and have placed *Gastrochæna* with *Teredo*, *Fistulana*, *Aspergillum* and others which enclose their two valves in a shelly tube open at one or both ends? We may also ask if the commonly called *Pholas papyracea* (a shell which has lately become pretty generally known) may not be considered as the type of the connecting link between the two families, inasmuch as it has the general form and characters of a *Pholas* and apparently commences a shelly tube at one end?

*Pholas* is one of the few genera which has always remained nearly entire, excepting that occasionally a species of some other distinct Genus may have been in-



## PHOLAS.

truded into it; for although Lamarck has supposed the family might contain several distinct genera, he has not attempted any division; Leach, it is true, undertook to divide the Linnean *Pholades* into several genera, but as his distinctions consisted principally in the number of what have usually been called the *accessory valves*, and as almost every species differs in the number of these, we have not thought it necessary to adopt any of his genera: they appear calculated for divisions of the Genus, but not sufficiently strong as generic distinctions. There are some species, the *Pholas clavata* Lam. for instance, which, on account of their being closed at both ends, it might be proper to distinguish as a Genus, because this circumstance implies a difference in the habits of the animals by which they are formed; this character has therefore been seized by Leach, and upon it he has constituted his Genus *Martesia*, and we should have been induced to have followed his example in this instance, had we been convinced of its necessity.

The *Pholades* may be described as transversely oblong, equivalve, very inequilateral bivalves, whose external surface is generally rough, like the surface of a rasp or file, with muricated striæ or ribs which diverge from the umbo and pass to the margin; when the valves are closed, they gape at both ends (in most species) but the opening is very large at the anterior end in the greater number, and extends along the margin; but in some species it is almost closed by an addition of testaceous matter to the edge of the shell, over which the radiating muricated striæ are not continued. We believe all the shells of this Genus are furnished with a greater or less number of accessory valves, which appear to be caused by the deposition of shelly matter (within the epidermis and connected with the valves by that membrane) wherever such valves were necessary for the security of the inmate; they are consequently very various in form, and placed in different situations in the different species, though in most cases they are placed near the hinge, and have even been considered to be substitutes (in these shells) for the permanent ligament of other bivalves: we must for the present withhold our assent from this opinion, because, on account of the situation in which they live, the animals inhabiting these shells can have very



## PHOLAS.

little occasion to open their valves. A long, curved, sometimes hooked, rather flat, sometimes expanded and somewhat spoonshaped tooth is found in each valve inserted beneath the hinge margin, and as it were growing out from the inner part of the umbo: this tooth is peculiar to *Teredo* and *Pholas*. The anterior dorsal margin of the shell in the region of the umbones, is reflected, as we believe, in all the species; in some cases it is simple, and laid down almost close upon the umbones, in others a second margin is produced, which is placed at a distance from the first, and the space between is divided by a greater or smaller number of entire transverse septa. Whether or not there is any permanent ligament in this Genus, as we have never observed the animal alive, we cannot undertake to determine; Turton says it has none; Lamarck, on the contrary, speaks of the accessory valves covering and hiding the ligament. As far as we can form an opinion from dried specimens, we cannot consider the substance to which these valves are attached as the ligament, but as part of the adductor muscle, nevertheless we think we can in some species perceive a very small internal ligament, attached to two unequally sized small curved teeth (one in each valve) placed in the same situation as the hinge teeth of common bivalves. The adductor muscle forms two principal impressions, one of which is placed on the reflected margin, over the umbones, and the other about half way between the umbones and the longer end of the shell; there is also a large sinus in that narrower part of its impression by which the mantle is affixed, and at the angle that is formed by this sinus, very near the basal margin of the shell, the impression is somewhat expanded.

The principal differences between *Pholas* and *Teredo* consist in the latter forming a shelly tube behind its valves, and in its being destitute of accessory valves, moreover the two valves of this latter, when closed, are nearly globular: the same characters distinguish *Pholas* from *Xylotrya* of Leach: *Xylophaga* of Turton, which has accessory valves, and which does not form a shelly tube, is however destitute of the internal curved tooth, which is common to *Pholas* and several *Tubicolées*.

There are many recent species of *Pholas*, some of which are very abundant in the rocks of our coasts; of

## PHOLAS.

these the *P. crispata*, *Dactylus*, *candida* and *parva* are the most common; several others are described by Turton in his British bivalves, of which we are quite convinced the *P. lamellata* is only the young of *P. papyracea*; we are not acquainted with his *P. tuberculata*. Among the species of this interesting Genus that are not found on our coasts are the *P. orientalis*, a very scarce East Indian species, and the *P. costata*, of which we have drawn a fine specimen brought from Mexico by Mr. Bullock, for the use of which we are indebted to the kindness of the Rev. Dr. Goodall. Much confusion appears to prevail in regard to several very distinct species: among these we believe the *papyracea* of Turton is the *striata* of Montagu; the *clavata* of Lamarck is the *striata* of Linneus, but not of Mont. We cannot approve of Lamarck's changing the name of Montagu's *P. parva* to *P. dactyloides*.

Fossil Pholades are rare, they occur in the *Calcaire grossier* and contemporaneous formations in several places, and also in our Crag: several very interesting species are found in Italy and in Touraine, as well as in the vicinity of Paris, where these and several other perforating shells have been discovered in a fossil state in the cavities which they have themselves formed.

The manner in which these and other perforating shells produce the cavities in which they live, in stone, wood, &c. has long been a subject of controversy; we are the less inclined to add ourselves to the number of disputants, as we understand the subject has lately undergone experimental investigation, and that the results are likely soon to be made known; we would only state that it cannot be by a rotatory motion, since the cavities are fitted to the shape of the shell; and since animals whose shells are perfectly smooth on their outside are equally capable of producing these cavities as others whose external surfaces are rough like a file; nor do we think it can be by the chemical action of any solvent, since the same effect is produced on *Wood*, *Limestone* and *Sandstone*. We have been informed that the *Teredo* eats its way into *wood*; query, do the *Pholas*, and others perforate *Wood*, *Chalk*, *Limestone* and even *Sandstone* in the same manner? or have some of them the power of dissolving stone, while others form their cavities by eating away wood.

## ONISCIA.



**TESTA** oblonga, subcylindrica, apice obtusiuscula, basi acuminata: *Spirâ* brevi; *aperturâ* elongatâ, basi in canalem brevissimum desinente; *labio externo* subincrassato, internè denticulato, medianè subcoarctato, *interno* expanso, granuloso.



A GENUS sufficiently distinguished from *Cassidaria*, by its granulated inner lip, its very short, scarcely reflected canal, and its very singular general form. We should have hesitated to separate it from *Cassidaria*, had we been acquainted only with the species named by Linneans *Strombus Oniscus*, but as three other species are known, one a fossil, another the elegant shell which holds the most conspicuous place in our plate, and the third nearly related to *Oniscus*, we have adopted the Genus under the name of *Oniscia*. Its place in a natural system is next to *Cassidaria*, to which it is most nearly related; it does not appear to us to be at all related to *Strombus*, and though placed in that Genus by Linné, it has not its principal characters. It differs also from *Cassis* in the canal not being suddenly reflected, although we remember to have seen *Cassides* which very nearly approach this in the form of the aperture, and in the short, scarcely reflected canal, so that we think this may be considered as the intermediate Genus between *Cassidaria* and *Cassis*, always remembering that there is no difficulty in distinguishing it from the latter, which has always a reflected canal, and the base of its columella sharp edged.

Shell oblong, subcylindrical, *apex* generally rather obtuse, *spire* short, sometimes very short; *base* rather

## ONISCIA.

acuminated; aperture longitudinal, elongated, extending at the base into a very short canal: *outer lip* thickened, denticulated within, and rather contracted in the center; *inner lip* expanded and covered with granules.

The outside of the shells of this Genus, in the four species we have seen, is tuberculated, cancellated, or ribbed, and in one, of which we have a young specimen, the spire is terminated by a minute mamillary point. Of the animal we know nothing, but there is every reason for believing it to be related to that of *Cassis*, and that it has an operculum, although we have never seen it. Of the species, which we know, three are recent, the *O. cancellata*, *O. Oniscus*, and a new species which we have just received from the South Seas, and which we have named *O. tuberculosa*. The fourth species is fossil; it occurs in the tertiary formations of Italy.

We have to acknowledge our obligations to W. J. Broderip, Esq. for the loan of the two specimens we have figured of *O. cancellata*; and to W. Swainson, Esq. for kindly ceding to us the opportunity of first illustrating this elegant and costly shell.

In our plate are represented

Fig. 1 & 2. Two views of *O. cancellata*, supposed to have been brought from the Isle of France, it may be characterized as follows: *O. superficie externa, lineis elevatis, cancellatis.*

3. A young shell of the same species.

4. *O. Oniscus.*

5. *O. Cithara.* Buccinum Cythara, *Brocchi Conch. Foss. Subapp. tab. v. f. 5. vol. 2. p. 330, found at "Belforte."*

We have rejected the generic term *Theliostoma*, which had been suggested to us by a Conchological Friend, because it does not appear to convey the meaning intended, viz. that of "granulated mouth."

## PYRAMIDELLA.



TESTA turrita, lævis, polita, anfractibus plurimis, apice acuto, aperturâ oblongiusculâ, supernè acutâ, basi subrotundatâ; labio externo paululùm expanso, in columellam tortam, plerumque plicatam, sursum reflexo.



IN introducing the present Genus to our readers, we have doubted the propriety of including in it several small shells which have never yet been properly placed, such as *Helix polita*, *Mont.*; *Bulimus terebellatus*, *Lam.*; and others, but which are nevertheless more nearly related to *Pyramidella*, than to any other Genus already established. Some of these are umbilicated; others are not; which is also the case with the true *Pyramidellæ*: the principal difference which we observe consists in the doubtful species having no folds on the columella, but inasmuch as the true *Pyramidellæ* vary in the number of these folds, some of them having only one, we are loth to separate from them those shells, which, though they have no fold, agree in other characters with them. We therefore combine under the generic appellation of *Pyramidella*, those shells which accord in the following characters:

Shell turrited, smooth, very rarely slightly ribbed, polished; volutions numerous, apex acute; aperture rather oblong, acute above, rather rounded at the base; outer lip slightly expanded, turned upwards at the base and united to the twisted columella; columella generally plaited. We have never yet had the means of ascertaining whether these shells have any operculum.

## PYRAMIDELLA.

Lamarck unites the Genus *Pyramidella* with *Tornatella*, to form his family *Plicacés*, they are marine shells, and therefore ought not to be confounded with the *Auriculæ*, we nevertheless are of opinion that *some* of Lamarck's *Auriculæ* should, under the generic term *Conovulus*, be added to this family; those species to which we allude, are the *Voluta Coffea*, Linn. and some others that are related to it; they may all be distinguished from the true *Auriculæ*, by the want of an epidermis, and from the *Volutæ*, by their having no canal at the lower end of the aperture. We are also of opinion that still another Genus should be constituted from those Lamarckian *Auriculæ*, such as *A. Dombeyana*, Lam. and *Volutæ fluviatilis* et *fluminea*, Maton,\* which are inhabitants of fresh waters. We do not know enough of their animal inhabitants, or of their habits to enable us to state their proper affinities.

Fig. 1. *Pyramidella Terebellum*, Lam.

2. ——— *terebellata*; *Turbo Terebellum*, Chemn.

3. ——— *maculosa*, Lam.

4. Magnified points of a young fossil *Pyramidella*.

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\* Linn. Trans. x. p. 330, tab. 24, f. 13, 14, 15.

## PYRULA.



**TESTA** tenuis, oblonga, supernè ventricosa, extremitate inferiore subattenuata: spirâ brevissimâ; aperturâ elongatâ medianè latiore, in canalem brevem, latum, productâ. [*Varices nulli.*] Labium externum acutum, minutissimè crenulatum, internè leviter incrassatum. Labium internum tenuissimum, expansum. Umbilicus nullus.



THIS Genus forms a part of the Linnean *Bulla*, than which nothing could be less scientific. Bruguière united it to his *Fusus*, with which, indeed, it is much more properly associated. We think Lamarck has scarcely improved upon Bruguière, in dissevering the true *Pyrulæ* from the *Fusi*, because he has united to them many others that ought to have remained where Bruguière left them. Upon the whole, it does not appear to us that Lamarck has shown his usual skill in ascertaining the characters that distinguish *Fusus*, *Fasciolaria*, *Pyrula*, and *Turbinellus*; but, on the contrary, he has involved these genera in almost inextricable confusion. In endeavouring to define each Genus, it may perhaps be necessary to throw out from them some shells which may constitute two or three new genera, but we will do this with the utmost caution, and in no instance when we can possibly avoid it.

The shells which, alone, in our opinion, ought to form the Genus *Pyrula*, are oblong, rather thin, and generally, more or less strongly cancellated on the outside; they have a thin epidermis which is scarcely ever sufficiently adhesive to remain on the shells when brought



## PYRULA.

into commerce; and their outer lip which, when perfect is thickened a little on the outside, is for the most part so brittle, that it seldom remains when the shells themselves adorn our cabinets. They are pyriform, ventricose above, rather attenuated below, and generally very regular: the spire is very short and rounded; the aperture is elongated, produced into a short, broad canal, narrower at its superior extremity, and broader in the middle on account of the columellar sinus. There are no varices; the outer lip is sharp edged, and very minutely crenulated. Inner lip very thin, expanded, sometimes scarcely visible. Umbilicus none. We suppose the animals of this Genus to be furnished with an horny operculum, but we have never seen them.

The only shells we admit into this Genus, are such as are commonly called *Figs* in commerce, they are distinguished from all others, by the regularity of their form, and the thinness of their shells; they are mostly of a whitish colour, and speckled with brown; sometimes violet within and seldom entirely white on the outside.

Several species are common in a recent state, they are principally brought from the East Indies. In the fossil state they are frequent in the Calcaire grossier, near Paris; they are also found at Bordeaux; and we have them in the London clay, at Bognor, Hordwell, &c.

Fig. 1. *Pyrula reticulata*, Lam.

2. ——— *Burdigalensis*, Defr. a fossil species from Bordeaux.

3. ——— *tricarinata*, Lam. another fossil species from near Paris.

## MACTRA.



**TESTA** plerumque tenuis, æquivalvis, subæquilatera, subtrigona, lateribus paululùm hians: *dente cardinali* in utrâque valvâ compresso, plicato-canaliculato, cum foveolâ adjectâ intus prominulâ; *dentibus lateralibus*, alterius valvæ, duobus anticis, duobus posticis, alterius, uno antico, uno postico. *Impressiones musculares* duæ, laterales. *Impressio pallii* adhærentis musculi sinu mediocri. *Ligamentum* duplex, majus internum, minus externum.



THE greater part of the Linnean *Mactræ* are here separated from the *Lutariæ* and *Anatinæ*, retaining, however, the Linnean generic appellation. We have not hesitated to alter the character of the Genus given by Lamarck, because we did not think it sufficiently descriptive of the peculiar lateral teeth of the shells composing it. Some have thought that the whole Genus might be divided into two; first, the thicker species whose lateral teeth are striated; and second, the thinner shells whose lateral teeth are plain: the former of these seem to us to be intermediate between the true *Mactræ* and the *Nuculæ*; but we have not ventured to separate them from the *Mactræ*, inasmuch as in the present state of our knowledge of their animals, we are not aware of any difference.

Shell mostly thin, sometimes rather thick, seldom very thick; equivalve, generally nearly equilateral; for the most part more or less regularly triangular; slightly gaping at one end, at the other scarcely, if at all. One cardinal tooth in each valve, which is folded into

## MACTRA.

the shape of the letter V, the point of which is nearest to the umbo and the branches diverging from it; next to this on the posterior side, and very close to it is generally placed a very thin sharp tooth; and sometimes in one valve the branches of the angularly folded tooth are disunited at the base, so as to form two diverging teeth. The pit for the ligament is placed immediately behind this angular tooth, and projects rather within the shell. Lateral teeth, two on each side in one valve, one on each side in the other, diverging from the umbones, and placed very near the margin of the shell; they are generally very thin, and in the thicker species perpendicularly striated: these lateral teeth are mostly elongated, and the inner ones more prominent than the outer; but in some species, *M. Spengleri* for example, they are quite short. Muscular impressions two, lateral, distant; that of the mantle has a small sinus. Ligament, consisting of two portions, (as usual) one, by far the larger, internal; the other external. In some species, the umbones are separated, and the ligament forms a deep pit extending both within and without to the point of the beaks: of this remarkable circumstance the *M. Spengleri* is also a strongly marked example.

This Genus contains a great number of species, some of which are handsome, and others very singular shells; upon examining a number of species, we think it might be desirable to divide it into several genera, because we find several distinct forms in it. Of the recent species, several are common British shells; some that are commonly admitted into it are only the young shells of other genera:\* others are peculiar to the East or West Indies, the coast of Africa, North America, &c. The fossil species are not numerous, they are only found in the tertiary beds, unless, indeed, some very singular fossils found in the secondary strata, particularly Oolite, be truly referable to this Genus; of this, however, we cannot be certain, because we know not their hinges: they will be found represented in Sowerby's Mineral Conchology.

Our plate represents at

Fig. 1. *Maetra Spengleri*.

2. ——— *turgida*, inside of both valves.

3. ——— *solida*, a magnified figure to show the striated teeth.

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\* *M. triangularis* for example, which is a young *Astarte*.

## LUTRARIA.



**TESTA** plerumque tenuis, æquivalvis, inæquilatera, transversim ovata vel oblonga, laterie postico plerumque longiore, hiantē, antico hiatus. *Cardo* dentibus, alterius valvæ duobus; alterius tribus, quorum posticus tenuis, compressus. *Ligamentum internum*, foveolæ dentibus adjectæ, deltoideæ, obliquæ, intus prominenti, affixum. *Impressiones musculares* duæ laterales, distantes; impressio pallii adhærenti musculi, sinu magno.



SUFFICIENTLY distinguished from *Mactra* by the absence of lateral teeth, and the large sinus in the muscular impression of the Mantle: and from *Anatina*, to which some of its species bear a near resemblance, by its internal ligament: at the same time it must be observed, that several of the shells of Lamarck's division, à *Coquille orbiculaire ou trigone*, have one on both sides, a lateral lamina almost in the shape of a tooth, which does not, however, appear to answer the same purpose. From the decided *Mactræ* to these last mentioned, there appears to be an almost imperceptible transition; so that we cannot profess ourselves to be entirely satisfied with the separation of these genera, while at the same time we are convinced of the necessity of distinguishing genera by certain parts of the shells, independently of the animals, although we still labour under great difficulty in deciding upon what characters may and what may not be considered as generic, on account of our slight acquaintance with the animals.

## LUTRARIA.

The Lutrariæ are generally thin, equivalve, inequilateral, transversely ovate or oblong shells, the posterior side for the most part the longer, but always gaping much more than the anterior side, which nevertheless gapes a little. Hinge of one valve with two teeth, of which one is sometimes compound, the other valve with three teeth, of which the center one is sometimes compound, and the posterior one is slender and compressed. Ligament internal, fixed to a deltoid, oblique, internally prominent pit placed next to the teeth in each valve. Muscular impressions two, lateral, distant: muscular impression of the mantle with a large sinus.

Of Lutraria the recent species are not numerous; several of those admitted to the Genus by Lamarck, are found on our coasts, particularly the *L. Solenides*, (which we believe to be *Macra hians* of British writers) the *L. elliptica*, (*Macra Lutraria*, Linn.) and *L. compressa*, (*Ligula compressa*, Mont.) which latter we think approaches more nearly to the *Amphidesmata* than to the *Lutrariæ*. A few species are rather thick, but by far the greater number are extremely thin, delicate and fragile shells. Of the thicker species the *L. Solenoides*, and of the thinner the *L. plicatella* may be cited as characteristic examples.

There are very few fossil species, perhaps none at all, for most of those hitherto called Lutrariæ, are proved to belong to other genera, and others are uncertain; while Lamarck's *L. crassideus* should by him have been arranged with his *Corbulæ*, though we are of opinion, that it should be united to some other shells that are found in the rivers of warm climates, and with them form a distinct Genus.

We have represented

Fig. 1. The insides of both valves of *Lutraria solenoides*.

2. A shell commonly called the Duck's Bill *Macra*, but which we cannot refer with certainty to any published description or figure: we should consider it to be Lamarck's *Lutraria papyracea*, if it agreed as well with the figure cited in Encl. Meth. t. 257, f. 2, as it does with his description.

## TORNATELLA.



TESTA ovalis vel oblonga, plerumque transversim sulcata, interdum lævissima, spirâ brevi obtusiusculâ, raro admodum acutâ; aperturâ longitudinali, elongatâ, supernè acutâ, infra subeffusâ; *labio externo* simplice, acuto; interno tenui, leviter expanso; columellâ spirali, incrassatâ, in labium externum ad basim desinente.



A FEW, mostly elegant, small shells, appear under the appellation of *Tornatella*, to form a very natural Genus, nearly related to *Pyramidella*, but sufficiently distinguished in several particulars. The shells of which we here speak, have been associated with the *Volutæ* by Linneans, on account of the fold or folds at the base of the inner lip; and by later authors they have been united with certain land shells, (also Linnean *Volutæ*), under the generic name of *Auricula*. Bruguière united the Genus to many other shells of very different characters in his *Bulimus*, but we believe De Montfort separated it from them all, under the name we have adopted after Lamarck and others. After describing *Tornatella*, we shall proceed to show how it is to be distinguished from other genera to which it either bears a resemblance or has been united. Our principal difficulty is to decide upon the propriety of uniting to it the singular little shell called *Pedipes* by Adanson, an union adopted by Lamarck, but which upon consideration we think unwarranted. Several other minute shells which have been commonly known by the name of *Auricula ringens*, although all undoubtedly marine shells, and quite distinct from the true *Auriculæ*, must also be distinguished, they having a decided notch at the base of the aperture.

## TORNATELLA.

Of the Tornatellæ, the shell is oval or oblong, having a somewhat cylindrical form; it is for the most part transversely striated or grooved, though very few species (if more than one) are quite smooth and polished. Spire generally very short, rather obtuse, in some very few species more elongated and acute. Aperture longitudinal, elongated; generally two-thirds of the length of the shell, very seldom not more than half, pointed at the upper end, and rather spread below. Outer lip simple, sharp-edged, inner thin and but little spread; columella spiral, thickened, running at its base, and turning up into the outer lip. A slight contraction and incrassation of the center of the outer lip, and a fold or two of the inner lip sometimes occur. Tornatella has no notch at the base of the aperture, which circumstance distinguishes it from *Volvaria*; its short spire, and its striated or grooved external surface, as well as its lengthened aperture, are characters by which it may be known from *Pyramidella*; *Pedipes* of Adanson is characterized by a large fold on the upper part of the inner lip, and an equally large tooth on the inside near the middle of the outer lip.

The shells of this Genus are marine: several species are found on the coast of the Indian Ocean; and one or two on those of Europe, the *T. faciata* of Lam. (*Voluta Tornatillis*, Linn.) is not unfrequent on our coasts: but we are not convinced of the propriety of uniting the *Voluta denticulata et bidentata* of Mont. with this Genus.

Several very pretty fossil species are known; in England they occur in the London clay, crag, inferior Oolite, &c.; in the neighbourhood of Paris, in the Calcaire grossier, and at Bordeaux, in an analogous bed.

De Montfort called this Genus *Actæon*, but we willingly follow Lamarck, who has called it Tornatella, from the name of a species which may be considered as the type of the Genus.

We have represented

Fig. 1. *Tornatella flammea*, (*Voluta flammea*, Gmel.)

2. ——— *nitidula*, Lam.

3. ——— *sulcata*, *Auricula sulcata*, Lam. a fossil species with an acute spire from Grignon. Several fossil species are figured in Sowerby's Mineral Conchology, from various strata; under the generic name of *Actæon*.



## NASSA.



**TESTA** oblonga, subturrita, apice plerumque acutiuscula: spirâ mediocri; aperturâ suborbiculari, longitudine latitudinem paulum superante, basi emarginatâ; *labio externo* plûs minûsve incrassato, supernè marginato, interdum appendice minore, instructo, intus denticulato vel sulcato; *labio interno* plerumque plûs minûsve expanso, incrassato, denticulo supernè ut plurimum adjecto. - Columellâ spirali, margine inferiore subacuto; canali brevissimo, reflexo. Operculum corneum.



THE Nassæ were formerly separated from the Buccina by Lamarck, but subsequently reunited to them, without his expressing his reasons for so doing: several characters in our opinion render it advisable to keep up the distinction formerly proposed, we have therefore adopted the Genus.

Shell oblong, generally subturrited, with the apex for the most part rather acute: spire seldom long, sometimes very short and obtuse, more frequently of middling length: aperture suborbicular, seldom nearly oval, though generally rather longer than broad; notched at the base: outer lip more or less thickened, sometimes furnished with a small marginal appendage close to the upper end, generally grooved or toothed within: inner lip most frequently more or less spread over the lower part of the last volution; this is sometimes also very much thickened, and very rarely extends to the point of the shell; and it has often a small tooth at the upper part, just within the mouth. Columella spiral, its lower margin rather

## NASSA.

sharp, sometimes terminated by a strong point, and often a little rugose. Canal extremely short, not projecting beyond the shell, but turned backwards. Operculum horny.

The shells of this Genus are commonly tuberculated, grooved, striated, or granulated, outside; but they are sometimes nearly smooth and polished. Several of them, on account of the thickened and expanded lip, have a very singular appearance, such are the *N. Thersites* and *gibbosula*. There are a great number of species of this Genus, several of which are common on our shores; particularly the *N. reticulata* (*Buccinum reticulatum*, Linn.) *N. Macula*, (*Buccinum macula*, Linn.) &c.: these are found alive in the sand feeding upon the common *Mactræ*, which they pierce by means of a peculiar proboscis, making an extremely regular round hole.

Few fossil species are known, they occur however, in the London clay and contemporaneous beds in France, Italy, &c.; also in the crag, and in some of the beds of green sand.

We think this Genus more nearly related to *Cassis* than to the true Lamarckian *Buccina*; in its thickened and spread lip, and its sharp edged Columella, it differs materially from *Buccinum*, and accords with *Cassis*.

A very singular little shell, called *Buccinum neriteum* belongs to this Genus, although it has been elevated to the rank of a distinct Genus, under the name of *Cyclops*, by De Montfort.

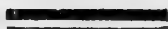
We have figured

1. *Nassa Arcularia*.
2. ——— *Thersites*.
3. ——— *Neritea*.

## BUCCINUM.



**TESTA** subovata vel oblonga, subturrita, apice plerumque obtusiusculo, spirâ mediocri; aperturâ suborbiculari, longitudine latitudinem paulum superante, basi emarginatâ: *labio externo* simplice, subreflexo, intus nonnunquam sulcato; *interno* plus minusve expanso, crassiusculo. *Columellâ* lævi; *canali* brevissimo, recto. *Operculum* corneum.



A GENUS, which, though it has already undergone several dismemberments, would in our opinion, have been more natural, had it been still further reduced: we think, moreover, that science would have been benefited thereby, even though it should prove necessary to constitute several new genera: for while on the one hand it appears to pass gradually into *Fusus*, (with a long straight canal); on the other it approaches to *Cassis*, by the intervention of *Nassa*, (with an extremely short, but reflected canal); then again, it is in some instances difficult to distinguish between the true *Buccina* and the *Purpuræ*, as it is also between them and the *Terebræ*. The characters we have given above, will, as we think, prove sufficient to distinguish it from all its cognate genera. In translating the character of the Genus, we shall also add a few observations by way of amplification for the benefit of *learners*.

Shell subovate or oblong, seldom elongated, subturrited, apex generally rather obtuse; spire of middling length, rather abruptly acuminate, seldom much longer than the aperture; which is suborbicular, mostly rather

## BUCCINUM.

longer than it is wide, but not elongated; notched at the base, and scarcely acute at its superior termination, where there is sometimes, as in *Nassa*, a small toothlike appendage, formed by a thickening of the inside of the outer lip; opposed to which there is also sometimes a similar tooth at the upper part of the inner lip, the two together inclosing a small sinus, which is itself the termination of a channel of frequent occurrence in the *Buccinidæ*; but with the use of which we are unacquainted. Outer lip with a rather acute edge, seldom a little thickened, sometimes transversely grooved within, and not unfrequently also dentated at the edge. Columella smooth, quite as prominent as the canal, occasionally a little rough near the lower extremity. Canal straight, mostly very short. Operculum, as in all the *Buccinidæ*, horny, thickish.

In our opinion the *Buccinum undatum*, (the common Whelk), ought to be taken as the type of the Genus, for it is a shell of frequent occurrence, and well known, being sold in the markets for food; several species are known, but few true *Buccina* are described, some occur in the British seas, as well as in the Northern ocean, and we have others from the coast of Africa.

Of fossil species there do not appear to be many; that named *B. stromboides* is not decidedly a *Buccinum*, for though Lamarck has by its specific name compared it with *Strombus*, we find its characters, except the absence of folds on the columella, would bring it nearer to that Genus, or Subgenus of *Volutadæ*, called *Cymbium*. More fossils of this Genus are found in the crag than in any other stratum, of these the reverse Whelk of the Essex, Suffolk and Norfolk crag is a remarkable instance, abounding as it does in many places in those counties, but not being found to our knowledge in any other part of the world. In the *upper marine formation*, and in the London clay, a few species occur.

## CORONULA.



**TESTA** suborbicularis, obtuso—vel compresso-conoidea, valvis senis, inæqualibus, lateraliter ferruminatis, valvam indivisam simulantibus, composita: *extremitate inferiore* truncatâ, affixâ; *superiore* operculo quadrivalvi membranisque clausâ: valvis operculi lævibus, oblongis, obtusis: parietibus crassissimis, intus plerumque cellulis radiantibus, excavatis.



SEPARATED from the *Balani* of Bruguière by Lamarck, on account of the peculiarities of its structure, although the number of valves of which the shell itself is formed, as well as its operculum, accord precisely with *Balanus*; the same reasons might have induced us to separate the species commonly called *Lepas testudinaria* from the other Lamarckian *Coronulæ* under another generic appellation, (which some conchologists have done,) had not the paucity of species seemed to render such a separation unnecessary. It must not, however, be forgotten, that on account of the different situations in which they occur, there is one very essential difference between the *Balani* and the *Coronulæ*, the latter being destitute of the shelly base by which the former are attached.

Shell suborbicular, sometimes nearly cylindrical, but more commonly of an obtuse or very compressed conical form, composed of six unequal, laterally soldered valves, having the appearance of being one piece; lower extremity truncated, attached; upper closed by the operculum consisting of four valves and their membraneous attachments. Valves of the operculum smooth, oblong, obtusely terminated. Sides of the shell very thick, their sub-

## CORONULA.

stance, in those species which are found attached to cetaceous animals, divided into radiating cells: in such as are found upon the Turtle, more solid and divided only at the base into irregular dentated ramifications.

Lamarck tells us that the shells of this Genus are not only found upon cetaceous animals and Tortoises, but also upon hard substances, such as shells, &c., but we have never met with them. The species that are found upon the whale in the southern ocean, such as *C. Diadema*, and *Balænaris* are partly imbedded in the skin and fat of the whale, which fills the radiating cells in the substance of the shells; consequently this Genus does not appear to us to be closed beneath at all, not even by a membrane as Tubicinella is.

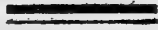
The few species of this Genus with which we are acquainted, with the exception of *C. testudinaria*, have six sets of longitudinal ribs, small, few, and converging at the upper end, but increasing in breadth and number towards the lower extremity, and their interstices are smooth and finely striated; but in the *C. testudinaria* the valves are themselves smooth, and their interstices divided into small cells. We consider it incumbent on us to mention a very singular specimen which we have seen in Mrs. Mawe's private collection, whose outer shell consists of only five pieces; this can, however, only be considered as an accidental variation.

We acknowledge with much thankfulness the permission that has been afforded us by the Curators of the museum of the Royal College of Surgeons, to examine and draw one of the very fine specimens of *Coronula Diadema*, which are preserved in that collection.

## SANGUINOLARIA.



TESTA æquivalvis, inæquilatera, transversa, subelliptica, compressa, tenuis, epidermide nitidâ induta, lateribus hiantulis, marginibus arcuatis, non parallelis. Dentibus cardinalibus duobus in utrâque valvâ; *fulcro* prominente. *Impressiones musculares* duæ, laterales, irregulares; impressio pallii adhærentis muscoli, sinu magno.



THE shells included by Lamarck under the generic appellation of *Sanguinolaria*, do not form a natural combination, his *S. occidentis* and *rugosa* being almost undistinguishable from several *Psammobiæ*, and his *S. rosea* and *livida* being as nearly related to his *Solenes*, *violaceus et rostratus*. Our *Sanguinolaria*, taking Lamarck's *S. rosea* as the type, will include his *S. livida*, (which we suppose to be the *Solen biradiatus* of some authors,) and the two *Solens* above-named; and we shall add his *Sanguinolaria*, *occidentis* and *rugosa*, to our *Psammobiæ*.

All the species we include in this Genus are *Solenes* of Linneans, nor were they separated from *Solen* by Bruguière, who has even united *Anatina* to them. It appears to us to be a genus, connecting the *Solenes* with the *Psammobiæ et Tellinæ*, and we think that in a natural arrangement it ought to be brought much nearer to the *Solenes* than it is in Lamarck's *Hist. nat. des anim. sans vert.*

The *Sanguinolaria* are equivalve, inequilateral, transverse, ovate, or elliptical, sometimes transversely oblong, compressed, generally thin shells, covered for the most part with a shining olivaceous epidermis. The



## SANGUINOLARIA.

length of the two sides of each valve differs in different species, the anterior in some, the posterior in other species being the longer. Both extremities of the shell gape a little, and the margins are not parallel to each other, but are generally rounded. Two distinct cardinal teeth are observable in each valve, but there are no lateral teeth: the fulcrum,\* or part of the shell to which the ligament, which is external, is attached, is mostly prominent, though less so in the type of the genus than in the species we have associated with it. There are two muscular impressions which are very irregular in shape, and the impression of the muscle by which the mantle is attached, has a large sinus. We have never seen the epidermis of *S. rosea*, for which reason we do not assert that it has any: its near resemblance in form and other characters to the shells with which we have associated it, induce us, however, to believe that it cannot be without one.

The species of this Genus are not numerous, they are brought from the East Indies, New Holland, and Jamaica: the *S. rosea* is a common shell; the other species are, however, much more rare.

In our plate we have represented at

- Fig. 1. *Sanguinolaria rosea*, Lam. *Solen sanguinolentus*, Linn.  
2. The hinge of the same.  
3. *Sanguinolaria Diphos*,—*Solen Diphos*, Chemn. et Nonnul. *Solen rostratus*, Lam.  
4. The hinge with the ligament of the same.

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\* The Fulcrum, see Zoological Journal, vol. i. p. 218.

## SAXICAVA,

*Lam.*



*Mya*, *Nonnul.* *Mytilus*, *Nonnul.* *Hiatella*, *Daud.* *Byssomya*, *Cuv.*  
*Cardita*, *Brug.* *Solen minutus*, *Lam. et Nonnul.*  
*Biapholius* et *Pholeobius*, *Leach.*



**TESTA** transversa, irregularis, plerumque oblonga, inæquilatera, subinæquivalvis, latere antico hiant. *Ligamentum externum.* *Impressiones musculares* duæ, laterales: impressio pallii adhærentis muscoli, interrupta, sinu nullo. *Cardo* testæ junioris, dentibus interdum duo ad quatuor minutis, obtusis, plerumque indistinctis, adultæ obsoletis.



THE shells which we include in the Genus *Saxicava* have had, in conformity with the various views of authors, at least six different generic names. While in contradiction to so many great authors, we unite under one generic name, shells that have been arranged by them under several different genera, we are sensible that we shall incur the displeasure of many of our readers; we will not therefore venture upon so hazardous a step without detailing the reasons which have convinced us, and which we think will convince the most sceptical that we are right. We must, however, premise, that it will not be disputed that *Solen minutus* of Chemnitz and Montagu, *Hiatella arctica* of Daudin, *Cardita arctica* of Bruguière, and the *Byssomya* of Cuvier, are one and the same species: that Leach's

## SAXICAVA.

Pholeobius includes as distinct species of the same genus the *Solen minutus* of Montagu, and the *Mytilus rugosus* of Linn. will also be readily admitted; now the former of these is *Hiatella arctica* of Lam. and Turton, and the latter *Saxicava rugosa* of the same authors; thus all the six genera are reduced to one by Dr. Leach, whose authority is indisputably very great in such matters; we do not, however, propose to our readers to take it as conclusive, but will state that we possess, as Dr. Leach also did, a series of specimens, the young ones of which are more regular in shape, and more strongly spinose than the older, and are to all intents and purposes *Hiatella arctica*, or *Solen minutus*, and the older specimens, losing the strongly marked double rows of spines, though always retaining indications of them, and assuming a much less regular form, become characteristic specimens of *Saxicava rugosa*: the hinge teeth of the younger specimens may be advanced as an argument against the identity of these shells, it is, however, well known that in many shells, particularly those that are irregular, the teeth become obsolete with age: thus, if the hinge teeth, the general form of the shells, or the double row of spines cannot be depended upon as generic distinctions, the Lamarckian genera *Hiatella* and *Saxicava*, and his *Solen minutus* merge into one: to show that the shells described as distinct species under either of these generic names are identical, is not important in the present work; it is therefore sufficient to observe, that in all irregular shells, that are either found attached to, or imbedded in rocks, corals, roots of sea-weeds, &c. the general form cannot be taken as a character; and we believe the *Mytilus præcisus*, and several of the *Saxicavæ* described by Lamarck and Turton, to be merely variations of *S. rugosa*, than which there is perhaps no shell more subject to variety in form.

Shell transverse, irregular, generally oblong, inequilateral, rather inequivalve, generally gaping in front, sometimes at both ends. Ligament external. Muscular impressions two, lateral impression of the muscle by which the ligament is attached, irregularly interrupted, without any sinus. Teeth in the young shells small, obtuse, generally indistinct, in the old shells obsolete.

## SAXICAVA.

The species of this Genus are not numerous, they are not, however, easy to distinguish from each other. They are frequently found upon the outside of oysters protected by their irregularities, and in clefts of rocks or corals, roots of sea weeds, and even perforating oysters, chalk, limestone, and hardened clay; those which themselves perforate the hollows, in which they live, are more regular than the others.

We have drawn at

- Fig. 1. *Saxicava rugosa*, young shell.  
2. ————— inside, showing the teeth.  
3. A full grown specimen of the same.  
4. The inside, showing the muscular impressions.



## PINNA, *Auctorum.*



**TESTA** æquivalvis, obliqua, longitudinalis, cuneiformis, umbonibus anticè terminalibus, acutis, latere postico plerumque truncato, hiantē; basi, margineque antico (hiantulo) lineam continuam, rectam, obliquam formantibus; ligamento elongato, per totam dorsi longitudinem continuo. *Impressiones musculares* duæ, postica maxima, subcentralis, antica terminalis, nonnunquam duplicata; impressio muscularis pallii irregularis, sinu nullo.



**SHELL** equivalve, longitudinal, oblique, wedgeshaped, with the umbones forming a point anteriorly; posterior side generally truncated, always gaping; the base and anterior margin, which latter is also somewhat gaping for the passage of the byssus, forming together a straight continuous line: ligament very much lengthened, partly internal, continuing along the whole dorsal margin. Muscular impressions two, the posterior very large, nearly central; the anterior terminal, sometimes double: muscular impression of the mantle irregular, without any sinus.

The Genus *Pinna* appears to us to be one of the most easily distinguished, indeed we do not know of any Genus with which it can be confounded, except perhaps the Lamarckian *Mytilus*, which alone has the acute terminal umbones so characteristic of *Pinna*. *Mytilus* may, however, be known by its closed posterior extremity and by the greater depth of its valves. The *Pinnæ* are rather

## PINNA.

large shells, sometimes exceeding two feet in length; they are for the most part thin, and extremely brittle, being in a great measure formed of perpendicular fibres arranged side by side and adhering very slightly to each other. The shelly plate thus formed is lined with a very thin pearly coat, scarcely extending beyond the muscular impression of the mantle, and consequently only covering the body of the animal, which usually buries itself in the sand or mud about low-water mark, and sometimes in deep water, with the pointed termination of the shell downwards, and fixes itself to pebbles and other substances by means of its long silky byssus, of which each individual possesses a considerable bunch. The byssus is frequently made into gloves and hose, at Naples and at other places on the shores of the Mediterranean, where several species of Pinna are very abundant.

The species of this Genus are rather numerous, and they are most frequently rough on the outside with irregular, pointed, sometimes almost tubular scales, though there are also some species that are nearly smooth: these scales cannot, however, always be depended upon as a specific character, since we have seen several individuals of the same species, one of which is quite rough with muricated spines, another has only a few, and the third is quite smooth. One species, commonly called *P. saccata*,\* which, on account of its usual irregularity, will not be found to accord well with our character, can, however, only be referred to this Genus, it having nothing to distinguish it except its irregularity, which is probably caused by the situation it inhabits.

We believe the Pinnæ to be inhabitants of all climates; several species are common on our coasts and the Mediterranean, the shores of the Atlantic and Pacific oceans, as well as those of the East Indies, produce others. We are acquainted with several fossil species, which occur in the secondary and tertiary beds of marine origin: one in particular is beautifully preserved in the indurated sandy bed of London clay, at Bognor; and another is not unfrequently met with in the Calcaire grossier, at Grignon.

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\* But not *Pinna saccata* of Chemnitz.



## PINNA.

There is a peculiarity observable in many Pinnæ, which has undoubtedly given rise to the appellation of *sub-quadrivalvis* applied to one species by Lamarck, and that of *tetragona* to another by Brocchi; it consists of a longitudinal division of the internal pearly coat, commencing at the anterior point within, and continuing rather more than half way towards the centre of the posterior side: a corresponding angle is frequently to be seen on the outside; and it is remarkable that these shells readily break in the direction of this line.

We have represented at

Fig. 1. The beautiful *Pinna serrata* of Solander, from the specimen in the Tankerville Collection.

2. The inside of a single valve of *P. nigrina*, to shew the muscular impressions and the ligament.



## MYTILUS.



TESTA æquivalvis, obliqua, longitudinalis, subcuneiformis, umbonibus anticè terminalibus, acutis; latere postico rotundato, (clauso;) basi margineque antico (subhiantulo) lineam continuam obliquam formantibus: ligamento elongato, subinterno: *impressiones musculares* duæ, postica majuscula, irregularis, antica minima, terminalis: impressio muscularis pallii irregularis, sinu nullo.



SHELL equivalve, obliquely longitudinal, rather wedge-shaped, with the umbones forming a point in front; posterior side rounded, not gaping; base forming a continuous line with the anterior margin in an oblique direction to the hinge line: anterior margin very slightly gaping for the passage of the byssus; ligament much elongated, rather internal: muscular impressions two, posterior large and very irregular, anterior very small, terminal; muscular impression of the mantle irregular, without any sinus.

It is well known that the Linnean Genus *Mytilus*, on account of its principal character being its want of hinge teeth, consists of several forms that are widely distinct from each other, and which have well served as the types of several Lamarckian genera, such as *Avicula*, *Modiola*, *Anodon*, and others in connection with the present Genus, which deservedly retains the name of *Mytilus*, both on account of its form, and the priority of its claim. The other genera which have been united with it, but from which it appears necessary to distinguish it because of a certain degree of general resemblance, are *Modiola* and

## MYTILUS.

*Lithodomus*: from *Anodon* and *Avicula*, together with Lamarck's *Meleagrina*, it is obviously so distinct that we need not enter upon its particular marks of discrimination; and one character will suffice to distinguish it from *Modiola* and *Lithodomus*, namely, the pointed terminal umbones of *Mytilus*.

The true *Mytili*, so named, as we have been informed, from their resemblance in shape to a Mouse, are marine;\* they are very abundant on almost every rocky coast, being found attached by their coarse filamentous byssus to whatever substance first comes in their way. We do not think that after being once attached, they habitually disengage themselves, though it appears to us probable that when disengaged by the force of the sea, they may live for some time without being in any manner affixed: there appear to be many species, which are mostly smooth on the outside and covered with a strong horny epidermis, which is generally worn off about the umbones; several are, however, more or less deeply and longitudinally grooved: a few very small teeth are occasionally observable close to the umbones within, and there is sometimes a small septum placed just within the beak in each valve, to which the anterior adductor muscle is in those species attached.

The British species of this Genus enumerated by Turton are four: we are far from being satisfied that they are distinct, for the principal character upon which Turton seems to place dependance is the number of minute teeth within the anterior point.

The fossil species with which we are acquainted are not numerous, they occur, however, in some of the beds below the chalk, (as well as in most of those above it,) but particularly in the crag.

In our plate we have represented

Fig. 1 & 2. *Mytilus achatinus*, Lam.

3. ——— *crenatus*, Lam.

4. ——— *polymorphus*, Gmel.

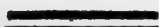
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\* We have here said "*the true Mytili*," because it may become necessary to separate from them some shells which accord very well with them in form, but which, nevertheless, differ from them in some of the characters of the animal, and in being inhabitants of river waters: such as the *Mytilus polymorphus*, Gmel. found in the Danube, and in the Commercial Docks, near London, &c.

## SILICUARIA.



**TESTA** tubulosa, irregulariter contorta, postice attenuata, ad basim interdum spiram regularem formans: fissurâ longitudinali, interdum subarticulatâ, per totam fere longitudinem usque ad aperturam terminalem continuâ.



**SHELL** tubular, irregularly twisted, attenuated at the posterior extremity, and sometimes forming at the base a regularly convolute spire, strongly resembling a *Serpula*, but most easily distinguished from that Genus by having a longitudinal, sometimes subarticulated fissure commencing near the smaller point, and continuing through its whole length, until it unites with the aperture at the larger extremity.

Separated from the Linnean *Serpulæ* by Bruguière, being well characterized by the longitudinal fissure, which there is reason to believe is intended for the passage of the lateral or dorsal branchiæ of the animal, consequently proving a remarkable difference in the nature and economy of its inhabitant from that of *Serpula*. Transverse septa are sometimes observable in the tube; of course these are always posterior to the animal, and shew that as it increases in size, it does not fill the whole length of its tube: we find, therefore, that the fissure is more or less closed behind these septa. The type of this Genus is the *Serpula anguina*, Linn. to which a few more species are united, none of them known on our coasts. We have reason to believe, that in their natural situation they are attached to and imbedded in a species of sponge or

## SILIQUARIA.

**Tethya.** These shells are seldom smooth on the outside, but more commonly rough with small points, wherefore one species has been called *muricata*, another *Lima*, and a third *spinosa*. The *S. anguina* is remarkable for numerous deep transverse furrows, which have the appearance of being caused by the contraction of the shell in drying, and which singularly resembles the contraction of the muscles of a fish upon being scored: we can only account for such an appearance, by supposing the parts of the shell that present it to have been deposited in a soft or gelatinous state, and afterwards to have hardened and contracted.

In our plate we have given representations of three specimens of the *Siliquaria anguina*:

Fig. 1. Is taken from the fine specimen that lately formed part of the Tankerville Collection.

2. Shows a regularly spiral specimen.

3. A small and young specimen, in which state it has been called *Helix incisa* by Linneans.

4. Points to the opening in the principal specimen which has become partly encrusted with a *Cellepora*.

## OCTOMERIS.

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**TESTA** subconica, valvis octo, inæqualibus, lateraliter conferruminatis, composita; apice pervio, basi adhærente (*valvâ testaceâ clausâ?*) Operculum bipartitum, valvis quatuor compositum, anticis majoribus.

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It may, perhaps, be interesting to our readers to trace with us the history of our knowledge of the singular class of animals to which the present new Genus belongs: thus if we begin with the Linnean system, where the entire class forms but one Genus under the name of *Lepas*, we must be convinced of the truly natural character of the Genus, as well as of the finely arranged views of that Father of Natural History as a science. The Linnean *Lepas* was by Bruguière divided into two genera, under the appellations of *Balanus* and *Anatifa* (rightly *Anatifera*), which divisions correspond exactly with those of Lamarck, which he designates by the terms *Cirripèdes sessiles et Cirripèdes pédunculées*. We shall, however, find that our countryman, Leach, has been the first to define in an able manner the genera into which the family should be divided: having, in the first instance, formed the two primary divisions of *sessile* and *pedunculated*, under the terms *Campylosomata* and *Acamptosomata*, he divided the former into *Balanus*, *Acasta*, *Creusia*, *Pyrgoma*, *Clitia*, *Tubicinella*, *Coronula*, *Chelonobia*, *Conia*, &c.; and the latter into *Pentalasmis* (the same as *Anatifera*, Lamarck), *Pollicipes*, *Scalpellum*, *Otion*, *Cineras*, and others. Not, however, finding these divisions to be sufficient, he has in manuscript, on the boards of the collection at the British Museum, proposed several other genera, which, as he has not anywhere given the characters of them, we cannot further enter upon. We would only observe, that Mr. Ranzani, in his *Mem. di Storia Naturale*, proposes a new division of the family, separating the *Balanida* from the *Anatiferida*, and giving the characters of the following genera, as forming the family of *Balanida*: 1st. *Asemus* (the same as *Conia* of Leach, *Polytrema*, De Ferussac,



## OCTOMERIS.

and Tetracrita of Schumacher, according to De Ferussac.) 2°. Ochthosia, (the same as Clitia, Leach, Verruca, Schumacher, and Creusia Verruca, Lamarck.) 3°. Balanus, (Balanus verus Auctorum.) 4°. Chthalamus, (probably the same as a part of Leach's Coniæ.) 5°. Coronula, (the same as Chlelonobia, Leach, and Coronula Testudinaria of Lamarck.) 6°. Cetopirus, (Coronula Balænaris, Lamarck.) 7°. Diadema, (Coronula Diadema, Lamarck.) 8°. Tubicinella, Lamarck.) So that Mr. Ranzani has not actually proposed any new Genus, but has only elevated several Lamarckian species to the rank of genera. In the course of our work we have established one most distinct Genus of the family of Anatiferidæ, namely Lithotrya, and we now propose to establish another, and a most distinct Genus of Balanidæ. It is well known, that in the Genus Balanus of all authors, the shell consists of six pieces united together laterally to form the cone surrounding the animal and operculum. The Genus *Octomeris*, however, as its name implies, consists of *eight* pieces united in the same manner, to form the surrounding cone: its resemblance to Balanus will render it unnecessary for us to describe anything more than the characters in which it differs from that Genus, which are—first, the character we have already mentioned; secondly, the angular internal sutures of the valves; thirdly, the foliaceous structure of all the shelly parts; fourthly, the want of an internal plate; and, lastly, a thin epidermis, which appears constantly to cover this shell in its natural state, though seldom observable, because the species are frequently covered with foreign substances. The deeply sinuated and variously figured edges of the base cannot, in our opinion, be considered as an essential character of the Genus; but we think it probable that this Genus has no shelly base, though we have never seen any specimen attached to the rock.

We have given representation in our plate of the only species we have seen of this Genus, which we have lately received from the Cape of Good Hope, and named *Octomeris angulosa*.

Fig. 1. The outside.

2. The inside, showing the eight divisions.

3. The anterior piece.

4. The posterior piece.

5. to 10. The lateral pieces, three on each side.

11. The operculum, consisting of four pieces of which the two anterior are the larger.

## MODIOLA.



TESTA æquivalvis, obliqua, longitudinalis, oblongo-subcuneiformis, inæquilateralis, latere antico minimo, obtuso, postico rotundato, clauso; margine antico subhiantulo; ligamento elongato, subinterno; *impressiones musculares* duæ, postica majuscula, antica minima, terminalis; impressio muscularis pallii irregularis, sinu nullo.



AN equivale, oblique, longitudinal, oblong, rather wedge-shaped, extremely inequilateral shell; anterior side very small, obtuse; posterior rounded, closed: anterior margin gaping a little for the passage of the byssus, and forming with the base a line oblique to the dorsal line: ligament elongated, partly internal; muscular impressions two, posterior large, irregular, anterior small terminal; muscular impression of the mantle irregular, without any sinus.

The most important character, which serves to distinguish *Modiola* from *Mytilus*, consists in the smaller side of the former advancing before the umbones and giving the shell a rounded termination anteriorly. In every other respect it resembles *Mytilus*, to which it was united in most of the older books, in connection with other genera that are exceedingly distinct, as we have already shown. The *Modiolæ*, like the *Mytili* and many other genera affix themselves to submarine productions by means of a bundle of rather coarse fibres, commonly called a byssus, each fibre of which is fastened to the rock by its expanded

## MODIOLA.

external termination, and applied by the foot of the animal.

The recent species of *Modiola* are not very numerous; we have, however, several species on the coasts of Britain, of which the most remarkable are the *M. discrepans* and *discors*,\* these two, together with some others that resemble them in form, differ much from the common *Modiolæ*, and might perhaps with propriety be considered as a distinct Genus. Of fossil species there are not many, such as we know seem to belong principally to some beds of the Oolite series, there are others in the principal formations, both above and below the chalk.

Fig. 1. *Modiola Tulipa*.

2. ——— *semifusca*.

3. ——— *plicatula*.

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\* These we believe are on our coasts always found imbedded in the common *Ascidia*, and appear to be destitute of a byssus, while the much larger specimens that are brought from the West Indies are found completely enveloped in a fine silky byssus closely matted together and forming large bundles. Some cognate species, however, that have been brought from the Northern ocean appear to have been affixed by a few filaments only.

## PENTELASMIS.\*



**TESTA** quinquevalvi, lateraliter compressâ, pedunculo affixâ, valvis contiguis, inæqualibus, basalibus majoribus, subtrigonis, convexiusculis, anticè ad basim acutis, dorsali elongatâ, carinatâ, apice acuto, superioribus elongato-trapeziformibus, infra acutis. Pedunculus plerumque longissimus, lævis.



**SHELL** with five valves, laterally compressed, attached by a sometimes very long, smooth peduncle; valves contiguous, unequal, the basal largest, subtrigonal, a little convex, acute at the anterior base; the dorsal elongated, lanceolate, keeled, sharp at its upper extremity; upper valves in shape like an elongated trapezium, placed behind the lower lateral valves, acute at their lower extremity.

The Genus here given under the name of *Pentelasmis* is the typical genus of the family formed by Bruguière's Genus *Anatifera*, and is the same as Leach has called *Pentelasmis*, on account of its shell being composed of five pieces. Even if we had supposed Bruguière's name to have had the right of priority, we could not have adopted it, inasmuch as it is essentially bad, being founded on the ancient absurd supposition of the *Barnacle Duck* being produced from it: from whence also the commonly received English name of *Barnacle* has been applied to these shells.

The species of this Genus do not appear to be numerous, nor are they confined to any particular climate or

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\* From πέντε cinque and ἑλασμα lamina (propriè metalli.) We have reason to believe that *Pentelasmis* has been adopted by Leach from *Ray*.

## PENTELASMIS.

country, but are common everywhere. Several are found on our coasts, affixed by the base of their peduncles to sea-weeds, pieces of timber, the bottoms of shipping, &c. upon which they seem to increase very rapidly. Its shell consisting of only five pieces, may be considered as quite sufficient to distinguish it from *Heptelasmis*, Leach, which has seven pieces; from *Scalpellum*, Leach, which has thirteen pieces; and from *Pollicipes*, Leach, which has an indefinite number of pieces.

Fossil specimens of this Genus are exceedingly uncommon; we have never seen anything but fragments from two beds, viz. the Calcaire grossièr of Grignon, and the Suffolk Crag. There is, however, a fossil not unfrequently found in the Lithographic stone of Solenhofen in Germany, which has been referred to this Genus; nevertheless, from an attentive consideration and comparison of its structure with that of other *palates*, we are convinced that it is not a *Pentelasmis*, but part of the palatal bones of a fish.

We believe all the genera composing the two families of Balanidæ and Pentelasmidæ to be strictly marine.

The shells of this Genus are all thin, and their membranous integuments are open in front for the passage of numerous fringed tentacula, which, when the animal is alive in the sea water, are frequently in motion, as if intended to cause a current of water containing its prey to descend towards its mouth. Lamarck, observing certain characters in which these animals accord either with his *Brachiopoda* or the *Crustacea*, seems, however, to consider them as perfectly distinct; we venture, nevertheless, a hint drawn from the consideration of several analogies in the structure of various parts, that they may be regarded as an intermediate class of beings between the two above-mentioned. This, however, is only intended as a hint to draw the attention of naturalists who have good opportunities of observing them all in their living state.

We have represented at

Fig. 1. *Pentelasmis lævis*.

2. The valves of the same open and detached, to show their shape and disposition with respect to each other.

## POLLICIPES.



TESTA multivalvi, lateraliter subcompressâ, pedunculo squamulifero affixâ; valvis quinque superioribus majoribus, inferioribus minimis, omnibus supernè acutis.



SEPARATED by Dr. Leach from the other pedunculated *Cirripedes*, and particularly distinguished from it by its squamuliferous peduncle, as well as by the form and position of the five larger valves. The Genus is composed of a few species, of which the two principal were the Linnean *Lepades Pollicipes* and *Mitella*; to them may be added *Pollicipes villosus* of Leach, and we shall then have enumerated all the species with which we are at present acquainted: for we cannot follow Lamarck in adding the *Lepas scalpellum* to this Genus, because we are perfectly satisfied that there are equally good characters to separate this latter as a Genus from *Pentelasmis*, (Lamarck's *Anatifa*) as there are to distinguish *Pollicipes* from *Pentelasmis*.

*Pollicipes* may be described as a shell consisting of many valves, forming together a somewhat laterally compressed irregularly conical body, fixed upon a squamuliferous peduncle, which seldom exceeds two inches in length: the five upper valves are considerably larger than the rest; of these the anterior pair are placed one on each side of the opening, they are conical, elongated, and their upper points are reflected backwards: the central, which is also the terminal pair, is the largest, each valve is of the shape of an elongated trapezium, having an acute angle at its superior extremity: the dorsal

## POLLICIPES.

valve is much lengthened, broad at its base, rounded on its back, and sharp pointed at its apex. Between these five valves and the peduncle are a number of smaller valves, which are more or less elongated, and mostly triangular. All the valves are pointed at their upper ends.

Of the three species mentioned above, and named by Leach, *Pollicipes Cornucopia*, *Mitella* and *villosus*, the first is common on the rocks in many parts of the Mediterranean, and we have seen it in large groups; the second is said to have been brought from India, it is extremely rare, and we have never seen the peduncle complete; of the third we have seen very few specimens, and its locality is entirely unknown to us; our specimens were attached to the two valves of a *Modiola albicostata* of *Lam.* in the collection of Mr. George Humphrey.

Fossil species of this Genus are not known.

Our plate contains representations of

Fig. 1. *Pollicipes Cornucopia*.

2. ——— *Mitella*. From a fine specimen in possession of the Rev.  
Dr. Goodall.

3. ——— *villosus*.



## LUCINA.



**TESTA** æquivalvi, inæquilaterali, plerumque subdepressâ, lenticulari: dentibus, cardinalibus variis, plerumque duobus, minutis, interdum subnullis; lateralibus in alterâ valvâ utrinque uno in alterâ duobus, interdum subobsoletis: (dente laterali *antico* ad cardinem propiùs admoto.) *Ligamentum externum*, elongatum, marginibus valvarum partim celatum. *Impressiones musculares* duæ, antica in fasciam, interdum prælongam, producta, postica subrotundata, minor. *Impressio muscularis pallii* sinu nullo.



THE Linnean Genera *Venus* and *Tellina* have each contributed several species which appear to unite together very naturally to form the Genus *Lucina*, which was first established by Bruguière, and has been adopted by Lamarck and succeeding authors. In general form and appearance the shells that compose this Genus approach very nearly to *Amphidesma*, it is, however, easily known from that Genus by its ligulate anterior muscular impression; *Amphidesma* has, moreover, a very large sinus in the muscular impression of the mantle, and the tendinous portion of the ligament quite internal. It is therefore, rather singular that Lamarck should have placed several species of *Amphidesmata* among his *Lucina*. From Cytherea the *Lucinæ* may also be readily distinguished by the form of the anterior muscular impression, which in that Genus is never ligulate, notwithstanding which circumstance Lamarck has included some of the

## LUCINÆ.

finest species of true *Lucinæ* in it, namely the *L. tigerina*, *L. punctata* and *L. interrupta*. The circumstance that has led to this arrangement has undoubtedly been the proximity of the anterior lateral tooth to the hinge teeth. in which character the two genera accord:\* for though in some *Lucinæ* scarcely any traces of lateral teeth are observable, yet, whenever they do exist, the anterior are placed more nearly than the posterior to the hinge teeth.

The *Lucinæ* are equivalve shells, except one species, the *L. Childreni* of Gray, in which the valves do not appear ever to be alike, though sometimes one, sometimes the other is the smaller and flatter. They are inequilateral; some of the species, however, the *L. divaricata* for instance, have the appearance of being equilateral. In general they are nearly orbicular and lenticular, and rather depressed; there are, nevertheless, some species that are very nearly globular. The teeth vary much in the different species, both in number and size, but not in position; in some the cardinal teeth exist without the lateral, in others the lateral are more distinct than the cardinal, in a few species both are strongly marked, while in others there are no traces of either: where they do exist, there are generally two small cardinal teeth diverging from the umbo, and of lateral teeth one on each side in one valve, and two on each side in the other, the anterior lateral teeth being placed near to the cardinal teeth, and the posterior just behind the ligament.

Ligament external, elongated, partly concealed by the inflected margin of the shell, wherefore the internal tendinous portion is frequently seen lying in a deep elongated cavity between the teeth and the hinge margin: Muscular impressions two, distant from each other, the anterior† generally extended backwards and downwards in the form of an elongated or ligulate band: the posterior small and roundish. Muscular impression of the mantle without any sinus.

Most of the *Lucinæ* appear to be occasionally subject

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\* In the Catalogue of the Tankerville Collection we have restored these to *Lucina*; and we find that since the publication of that Catalogue, the same observation has been made by Deshayes.

† Called by Lamarck the posterior.

## LUCINA.

to a remarkable incrassation of the shell within the muscular impression of the mantle, probably caused by age, and the surface of this incrassated substance is often covered by deeply impressed dots: and in some fossil species, when broken, it is found to consist of close set, laterally aggregated, short, perpendicular fibres.

The species of this Genus are not very numerous; the most beautiful are unquestionably the *L. Tigerina* and *L. punctata*; the *L. Jamaicensis* and *L. Radula* have each a very elongated anterior muscular impression, and the *L. Pennsylvanica* has a most beautiful crisped epidermis. Of the British species the principal is the *L. Radula*, and there are several smaller sorts common to our shores.\* There are many fossil species that occur commonly in the tertiary beds, of which they appear to be characteristic. One of these, the *L. mutabilis*, *Lam.* is remarkably flat and irregularly expanded; and another that is common at Bordeaux is as singularly globular in its form.

Fig. 1. *Lucina punctata*, inside.

2. ——— *Jamaicensis*, inside.

3. ——— *Childreni*, inside.

4. ——— *Pennsylvanica*, to show its epidermis.

5. ——— *mutabilis*, inside.

6. ——— *Columbella*, to show the globular form and the teeth.

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\* Of these the *L. lactea*, *Lam.* is one; if we may judge from the repetition of the Synonyms, this shell which is a true *Lucina*, is twice repeated by Lamarck among his *Amphidesmata* under the names of *A. lactea* and *A. Lucinalis*.

# THE HISTORY OF THE

REIGN OF

CHARLES THE FIRST

BY

JOHN BURNET

OF LINCOLN

IN TWO VOLUMES

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LONDON

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Printed by J. B. at the Sign of the Sun in St. Dunstons Church-yard near St. Dunstons Church

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1679

## ASPERGILLUM.



**TESTA** æquivalvi, subequilaterà, utrinque hiante, in inferiorem et internum tubi testacei parietem omnino conferruminatâ, umbonibus extra tubum subprominulis: tubo *anticè* (*infernè*) clauso, at disco terminali poris minimis, numerosis, extùs subprominulis, fissurâque centrali, et margine tubulis minimis plerumque circumcincto; perforato: *posticè* (*supernè*) elongato, plùs minùsve attenuato, aperto, margine interdum reflexo, undulato.



LINNE has probably arranged the extraordinary shell which may be considered as the type of the Lamarckian Genus *Aspergillum* among his *Serpulæ*, on account of its tubular form and his faith in the prevailing error that it was naturally fixed to the rocks by the smaller and generally broken extremity. Lamarck, judging from analogy, and without knowing the animal, which we believe has never been seen by any naturalist, has nevertheless ascertained and exposed this error, and arranged the *Arrosoir* in a place which it seems very naturally to occupy, namely, in the family to which he gives the appellation of *Tubicolées*, on account of its animal inhabitants surrounding themselves with a testaceous tube in conjunction with the usual valves appertaining to all other *Conchifera*. The existence of these two valves has not been recognized by naturalists until very lately, because, as we suppose, they have not paid a sufficiently minute attention to the real structure of these singular shells, but have been satisfied with observing and admiring their

## ASPERGILLUM.

external characters and form. Another error, however, has arisen, and has been commonly adopted by English collectors, which it is equally necessary to correct: this error consists in supposing that the animal buries its shell partly in the sand, *exposing the larger fimbriated extremity* with a small hair-like fleshy tube passing through each little shelly tube of the fringe, giving it the appearance of an expanded flower standing up out of the sand. That the animal partly buries its shell in the sand, we know from certain information to be true, and that small tubular folds of the fleshy mantle line each of the little tubes that form the fringe is also probable, but the fact for which we contend is, that the *larger fimbriated extremity* is buried in the sand, and that the smaller open end, which must contain the respiratory and excretory tubes of the animal, is alone exposed, and this we think is proved by its analogy with all other *Tubicolées*, and particularly with *Clavagella*, which we have already published.

The very unusual structure of the shells which compose this Genus renders it a difficult task correctly to define its characters, we have, however, endeavoured to render the following concise description as clear and correct as possible. Shell consisting of two equal sized nearly equilateral valves, open at both ends and closely soldered to the inside, near the lower extremity of a clavate shelly tube, so that the umbones pass through the tube and are exposed, being rather prominent, on the outside of the tube; the *anterior* and *lower* end of the tube, of which the whole apparent shell consists, is in a great measure closed by a terminal disk which is all over perforated by numerous, minute, externally prominent pores; it has a small central fissure, and is generally surrounded by a marginal fringe composed wholly of small tubes, sometimes branched, but more frequently simple; the *upper* end of the principal tube, which is *posterior*, is elongated, more or less attenuated, and open; its margin is sometimes reflected and undulated: this open end is so commonly imperfect in the specimens that are brought to Europe, that it is impossible for us to ascertain whether the last character be constant or not. Some of the species attach grains of sand and small shells to the outer surface of their tubes.

The Genus *Aspergillum* is so easily distinguished from

## ASPERGILLUM.

all others that we need not point out the differences; all our English collectors will know it by the name of the *Watering-Pot Shell*, a name applied to it on account of the resemblance of its larger extremity to the rose of a watering pot. The few species that are known are occasionally brought from Java, New Holland, New Zealand and the Red Sea; we believe all the specimens that have been collected have been picked up on the shore, and that it has never been seen in its native situation. The smaller termination of the species from Java has never come under our examination. It will be seen that the species from the Red Sea, which we have represented, increases, probably periodically, in length at this smaller end, for it sometimes has two, three or more reflected, undulated fringes, surrounding the tube at unequal distances. Fossil remains of this Genus are of very unusual occurrence; we have only seen fragments of one species from a bed, resembling the *Calcaire grossier* of Paris, in the neighbourhood of Valognes, in Normandy, and casts of the inside of another from a limestone forming part of the banks of the Tagus, near Lisbon.

Fig. 1. *Aspergillum vaginiferum*, Lam. from a specimen brought from the Red Sea, by the Earl of Mountnorris, and presented by him to the late Earl of Tankerville, from whose collection it has since passed into that of the Rev. J. Goodall, Provost of Eton College. This figure shews the umbones of the two internal valves near the lower extremity: it is diminished.

2. A portion of the same, of the natural size.

3. *Aspergillum Javanicum*, Lam. dissected to show the internal valves, and a portion of a coriaceous substance which arises from their edges, and seems to form a lining to the principal tube.





# FISTULANA,

*Lam.*



Gastrochæna, pars, *Spengler.*



TESTA æquivalvi, inæquilaterali, ad marginem basi hiantissimâ, latere antico brevissimo; in inferiore tubi testacei parte inclusâ; tubo anticè (infernè) clauso, posticè (supernè) perforato, attenuato.



WHOEVER undertakes to remove the confusion that attends Lamarck's Genus *Fistulana* will find himself involved in difficulties from which it will be no easy matter to extricate himself. This observation is suggested by two considerations, 1st. That the greater number of shells he has included in his *Fistulana* belong properly to his *Gastrochæna*, and 2d. That his *Gastrochæna*, as we have formerly shown, belongs to his family of *Tubicolées*, in which also his *Fistulana* has a place. The confusion appears to have commenced by Lamarck's not properly quoting Spengler's Genus *Gastrochæna*, which was evidently instituted to include all bivalves inclosed in a shelly tube open only at one end; and which, according to Spengler's own memoir, contains some of those species which Lamarck has called *Fistulanæ*, together with others for which he has adopted Spengler's name. In executing the task we have undertaken we must endeavour to clear away the superfluities of Lamarck's *Fistulana*; we think we shall then leave it exactly what it ought to be, if indeed its existence as a Genus should be admitted at all. We will begin with his three last species; and of these, upon examining

## FISTULANA.

his *F. Lagenula*, a specimen of which we have sacrificed for the purpose, we find it accords in every character with *Gastrochæna*, it must therefore be removed to that Genus; the next species that claims our attention is *F. ampullaria*, this we have never seen: Lamarck, however, informs us that its "aperture is bicarinated within," a circumstance which proves this also to belong to *Gastrochæna*; next comes his *F. Pyrum*, of which the only character he mentions is that "the external tube is pearshaped and naked," in which respect it accords more perfectly with the *Gastrochæna* than with the type of *Fistulana*, we think, therefore, that this ought also to go into *Gastrochæna*.

Let us now proceed to Lamarck's second and third species; the first of these, namely *Fistulana corniformis*, judging from the characters of the shell which he gives and the figure of the animal to which he refers, must belong either to *Teredo* or *Teredina*\*, we think *Teredo*, because the phrase "*aperturâ anticâ tubulis duobus inclusis divisâ*" not only supposes the tube to be open at both ends, but in other respects forms an important part of the character of *Teredo*: to which circumstance may be added, that the valves in the figure exactly resemble those of *Teredo*. We think Lamarck's third species, *Fistulana gregata*, belongs to, and should form the type of, *Teredina*, because it has the same general form; the internal valves are of the same shape, and are also placed in the same situation, and further, because it is closed at the larger end, as *Teredina personata* evidently is. Thus we think we have disposed of Lamarck's last five species; there now remains only his first species, *Fistulana Clava*, (which must be considered as the type of the Genus,) and those species whose valves bear some resemblance to those of *Modiola*. We have seen many of these latter, and consequently from actual observation can assure our readers that they are *Lithodomi*† which have lived in Madrepores, and which in consequence of a very peculiar circumstance have been ranked among the *Fistulanæ*. Difficult as it is, we must endeavour to explain this circumstance: we have shown in a former Number that the *Lithodomi*, though

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\* Lamarck's *Teredina personata* is a cast of the inside of a tube closed at the larger end, like that of his *Fistulana gregata*. We think his *Teredina Bacillum* is a *Saxicava*.

† Or *Saxicavæ*, or *Gastrochænaæ*.

## FISTULANA.

covered with an horny epidermis, have the means of perforating Madrepores and other calcareous substances; they do not, however, themselves make any calcareous lining to the tube they form, so that the small stellated tubes of the Madrepores open into them on all sides; when the animals of the *Lithodomi* die, the shell remains in the perforations, which, together with the shells, become filled up with all sorts of extraneous substances which fall into them and also partly occupy the small stellated tubes of the Madrepore: afterwards, when the whole has become fossilized, a part of the Madrepore itself, being of a different substance from that filling the cavities, and more easily acted upon by external circumstances, frequently becomes decomposed and is carried away, leaving the substance which formerly filled the cavities, originally formed by the perforation of the *Lithodomi*, exposed in the form of a date-stone, or some more clavate body, attached to the mass by the smaller extremity, rounded at the larger, containing the two valves of the *Lithodomus*, and covered on the outside with small irregular stellated prominences, which are those portions of the substances formerly deposited in the cavities, that had fallen into the stellated tubes of the Madrepore. In this case the substance surrounding the shell has been regarded as the tube which contained it, and it has consequently been referred to the Genus *Fistulana*, as belonging to the *Tubicolæ*, and having two free valves inclosed in a shelly tube. As we have now fairly excluded all Lamarck's *Fistulanæ* except his *F. Clava*, we are disposed to think that this ought to be considered as a distinct Genus for the following reasons; it has a regular straight clavate tube, the two free valves that are included in the lower and larger closed extremity are very inequilateral and of a transversely elongated form, its animal does not perforate any substance, but merely forms its tube in the sand, particles of which frequently adhere to it, and when complete the two valves are confined to the lower part of the tube by a septum, open in the centre, and placed in the tube near their posterior and superior extremity: in all these characters it differs from *Gastrochæna*, to which it is most nearly allied, and with which it is associated by Spengler. The *Gastrochæna Lagenula* (Lamarck's *Fistulana Lagenula*) appears to connect it very closely with the

## FISTULANA.

other *Gastrochænæ*, because in that species the anterior extremity of the two internal valves is more produced than in most other species of the Genus: the *G. mytiloides* of *Lam.* being however, still more so, though not otherwise so nearly allied to *Fistulana Clava*. Notwithstanding the differences last mentioned, it is not without some hesitation that we allow *Fistulana* a place as a Genus, because the only species we can admit is so nearly allied to and has already been associated with *Gastrochæna* under the same generic appellation; the principal considerations that have induced us to adopt this conclusion are, 1st. the obligation we feel ourselves under to account for every Lamarckian Genus, and 2ndly, the very peculiar characters which distinguish this, and which by most naturalists will be thought sufficient to entitle it to that rank.

We do not advert to any of Lamarck's observations on the animal of *Fistulana*, because it does not appear that he had ever seen the animal of the only species we can admit to a place in it.

Shell equivalve, inequilaleral, gaping widely at the basal margin, with the anterior side very short. The two valves united by a ligament and included in the lower part of a shelly tube, which is closed at the anterior (inferior) extremity; attenuated and open at the posterior.

- Fig. 1. *Fistulana Clava*, showing the tube without a septum.  
2. ————— showing a septum.  
3. ————— outside of the valves.  
4. ————— inside of the valves.

## CYMBA.



**TESTA** levis, admodum ventricosa, plerumque unicolor. Epidermis lævis, fusca, tegmine quasi vitreo partim vel omnino obducta. Apex rudis. Spira brevissima. Columella curva, 2-3 plicata, plicis magnis, acutis. Labium externum haud reflexum. Basis profundè emarginata. Apertura hians. Operculum nullum.

Caput grande, planum, tentaculis remotis, oculis pone tentacula positis, mediocribus. Pallium magnum? Pes maximus.

Animal carnivorum.

Habitat marinum in calidioribus mundi veteris (a) regionibus.



NOTWITHSTANDING the judicious separations from the Genus *Voluta* of Linné, made first by Bruguière, and afterwards more largely by Lamarck, a careful examination will, we think, convince the zoologist that a still further division is necessary.

It would exceed the limits prescribed by the nature of this work to enlarge on a subject which may, perhaps, be entered upon more minutely elsewhere. Our present intention is merely to introduce to the reader a further division of the Genus as left by Lamarck into the genera *Cymba*, *Melo* and *Voluta*. The student, when he comes to consider this last Genus after the proposed separations, increased as it has been by the new species which have

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(a) Under this expression, Australia and all countries, excepting America and its islands, are meant to be included. At present there is no positive evidence of any species of *Cymba* being found in the New World. But Captain Marryat saw at the Cape of Good Hope, two shells, which, from his description, were most probably *Cymbæ*, and which the proprietor assured him came from the Rio de la Plata. The geographical distribution of the Genus given above ought not, therefore, to be deemed conclusive.

## CYMBA.

flowed in upon us so abundantly of late years, will find it sufficiently overburthened, and will be disposed to admit the probable expedience of even further divisions when the science of conchology shall be more advanced. At present, however, the only innovation intended is the separation of *Cymba*, part of the *Gondolières* (*Cymbiolæ*) of Lamarck, comprising what have been called the Boat-Melons, and *Melo* (part also of the same section) comprising both the simple and crowned Melons.

The first of these genera is now before us, and appears to form a natural group of *Mollusca*, whose shells are marked by very distinguishing characters. The shells are ventricose, light and buoyant, floating when placed upon their backs on water, and having when so placed a boat-like appearance. Their apex is rude and without regularity of shape. They are sombre, and, for the most part, uniform in colour. They are covered with a smooth brown epidermis, which is, again, more or less coated (in some instances, as in *C. proboscidalis*, entirely) with a vitreous covering or enamel-like glaze, probably secreted by the mantle. The columella is uniformly curved, and, it is believed, that none of the species have hitherto been found in the New World\*.

The Genus *Cymba* contains at present six species. On an accurate inspection we shall find that the apex, which in most of them can only be satisfactorily examined

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\* Should it be asked, why the generic name *Cymbium* is not adopted from Klein, Adanson, and Denys de Montfort? it may be answered, that the term *Cymbium* (not to insist on the greater propriety of *Cymba*, as a name for denoting a part of the *Gondolières*) was used by Adanson in the year 1757, for a Genus, which from the extreme simplicity of the structure of the shell, he places at the head of the univalves, and which, under no system, could be deemed even an approach to a turbinated shell with plaits on the pillar. Denys de Montfort (in 1810) uses *Cymbium* to designate shells of which he makes *Voluta Æthiopica*, Auct. (the only species mentioned by him,) the generic type. Klein, it is true, calls Adanson's Yet "*Cymbium*;" but Gualtieri had used the word in 1742, (eleven years before Klein published his "*Tentamen*," ) as a generic name for those *Mollusca*, afterwards called *Argonautæ* by Linné, who appears to have first bestowed the latter name on the Paper Sailors.

It may be added that De Blainville in his "*Malacologie*" figures *Cymba Cymbium* (*V. Cymbium*, Auct.) as an illustration of De Montfort's Genus; and we therefore suppose that all the *Gondolières* of Lamarck are considered to belong thereto. De Montfort gives the following as one reason for dividing his Genus from the *Volutes* "*Le mamelon de leur coquille est particulier.*" A glance at the apex of *Cymba Neptuni*, and that of *Melo Indicus* will shew their striking difference. The apex of one is a shapeless mass; that of the other is regularly and beautifully fashioned.



## CYMBA.

in young shells, becomes progressively less rude and more firm, till in *Cymba Cymbium* (*V. Cymbium*, Auct.) it takes the form of a smooth button or nail head; and, on arriving at this species, we have, for the first time variety of colour in the full grown shell, though obscurely clouded and ill defined. Lamarck refers to Adanson's figure of *L'Yet* for our *Cymba Neptuni* (*V. Neptuni*, Auct.) and though Linné refers to the same figure for his *V. Cymbium*, there can be little doubt that Lamarck is correct in his reference. Our description of the soft parts is taken from Adanson. The animal is carnivorous, and is eaten by the natives of the coasts where it abounds.

We are not aware that any of the shells of this Genus have been found in a fossil state.

Fig. 1. A young shell of *C. Neptuni*, (*Voluta Navicula*, Gmel. for this is one of the many instances of the difference of age being mistaken for specific difference,) showing the amorphous apex, which in old specimens becomes entirely concealed.

2. *C. Cymbium*.

3. A small but old shell of *C. proboscidalis*, the apex entirely concealed, and the whole shell covered with the enamel-like glaze.

For the descriptions of this and the following Genus, *Melo*, the public are indebted to W. J. Broderip, Esq. who has also kindly engaged to furnish the description of *Voluta*. This gentleman's polite compliance with our request, that he would assist us in this part of our labours, has obliged him to anticipate in our work some parts of his own monographs of the Genera *Cymba*, *Melo*, and *Voluta*; thus increasing our obligation to him: an obligation which, however, we are the more willing to incur, because we are fully assured that from the extensive collection he has brought together in illustration of the species, and his intimate acquaintance with the subject, he is the only person capable of doing it justice.



## CATOPHRAGMUS.\*



TESTA subconicâ, apice pervio, basi adhærente, (valvâ testaceâ clausâ?) valvis octo, inæqualibus, lateraliter adjunctis, compositâ; valvis porro plurimis per series externas, circulares, gradatim minores, confertim co-ordinatis. Operculum bipartitum, valvis quatuor, anticis majoribus, compositum.



WE have ever been anxious to avoid increasing the number of genera as much as possible, not, indeed, because we entertain the impression that by so doing we should increase the difficulties attending upon our favourite pursuit; for, on the contrary, we are persuaded that an increase in the number of genera, where there are sufficient distinguishing characters, would materially lighten the toil of the student. Our reason for this anxiety has rather been the want of preparation in the mind of students to profit by such improvements as have been and might be daily introduced. The sort of preparation we mean is the adoption of *correct first principles*, upon which alone, as on a foundation, a symmetrical and beautiful system can be established. That these correct first principles are only to be obtained by the study of the Mollusca, which form and inhabit shells is becoming daily more and more apparent, yet the shells themselves may in most cases be regarded as indicating many of the more important facts in connection with the history of their animal inhabitants, and may consequently be generally considered as sufficient to demonstrate characters strong enough for the establishment of genera; with these views therefore we do not hesitate to propose the present new Genus, which, without knowing the animal, yet from analogy, we judge to belong to Leach's "*Cirripedes acamptosomata*," the "*Cirripèdes sessiles*" of Lamarck.

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\* From κατω infra et φραγμός septum.

## CATOPHRAGMUS.

In its general form and appearance it closely resembles "*Octomeris*," a Genus which we lately thought it our duty to propose, and, as in that Genus, the shelly cone immediately surrounding the animal, consists of eight pieces, and its operculum is also composed of four pieces. Here, however, the particular resemblance of the various parts cease, and we have now to describe the peculiarity of our present new Genus. This peculiarity consists in a number of narrow perpendicular valves arranged around the above mentioned shelly cone, and in rows, like pales, the first row of which consists of eight pieces, placed so as exactly to cover the sutures of the shelly cone immediately surrounding the animal; around this are then placed several sets of more and more numerous pieces gradually decreasing in size, so that the outer row which is the most numerous consists also of the smallest pieces. Additional rows seem to be produced as the animal increases in age; for a young specimen in our possession has only one row of eight pieces covering the sutures of the first cone, while a much larger and older specimen still retains part of three rows, and has evidently lost some of the external rows. The young individual also shows that the whole of the pieces are pointed at their superior extremities, whereas, in the old shell these extremities are so worn or eroded as to become very irregular and obtuse. The valves of the operculum are also pointed.

We do not observe any epidermis, though there is probably a very thin one on those parts that are not worn.\*

Two specimens only of this singular *Cirripède* have come into our possession; one of these was found in the collection of the late George Humphrey, and the other is attached to a Conia, which we received from Antigua.

In our plate we have represented, at

- Fig. 1. The young specimen of its natural size, upon the base of a Conia.  
2. The young specimen magnified.  
3. & 4. Two views of the old shell, natural size.  
5. & 6. The same views, magnified.

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\* We are glad to take this opportunity of correcting an error into which we have fallen, in stating *Balanus* not to have an epidermis. We believe when in their natural state the shells of that Genus always have a thin horny epidermis.

## MELO.



**TESTA** ventricosa, levis, ut plurimum colore vario. Epidermis lævis, viridi-fusca. Apex mamillaris. Spira brevis. Columella vix recta, 3-4 plicata, plicis magnis, acutis. Labium externum haud reflexum. Basis profundè emarginata. Apertura hians. Operculum nullum.

**Caput** grande, planum, tentaculis lateralibus, remotis, oculis pone tentacula positis, magnis. Branchiæ satis magnæ, dextra major. Pallium mediocre. Pes maximus, ovalis.

**Animal** carnivorum.

**Habitat** marinum in calidioribus mundi veteris regionibus.



THE apex, which, in *Cymba*, was almost a shapeless mass, takes in *Melo* a well-fashioned and spirally marked form. With this first appearance of the mammillary summit begins the elegant and vivid colouring which is its almost constant companion. The suture of the spire, no longer rude, is either neatly laid down around the apex, so as to touch it, and in some instances overwrap it, or, as in the coronated section, is free and adorned with a diadem of vaulted spines.

The shell of *Melo* is ventricose, light, melon-shaped, and floats when placed with its back on the water. It is generally marked with a well defined variety of colour, and covered with a smooth greenish brown epidermis,\*

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\* Lamarck speaking of his Genus *Voluta*, says "Les espèces sont en général lisses, brillantes, et il ne paraît pas qu' aucune d'elles soit pourvue d'un drap marin." The writer who has ventured to propose these new Genera hopes to be enabled to shew that most, if not all, of Lamarck's Genus *Voluta*, are provided with a "drap marin."

## MELO.

which is in some species very thin, but always wants the glazed coating of *Cymba*. The apex is mammillary, and looks almost as if it had been turned in a lathe. The pillar, which is hardly straight, has from three to four plaits sharp and well developed. The edge of the outer lip is not reflected, the base is very deeply notched, and the aperture, which is unprotected by any operculum, is very wide.

The Melons, some of which grow to a very large size, are inhabitants of the warmer regions of the old world. We are indebted to M. Freycinet's beautiful work for a figure and description of the soft parts of *Melo Æthiopicus*, (*V. Æthiopica*, Auct.) which was found in Sharks' Bay, and is carnivorous.

### SECTION 1.—*Spirâ inermi*.

*Melo Indicus*, (*V. Melo*, Auct.)

### 2.—*Spirâ spinis fornicatis armatâ*.

Ex. *Melo Æthiopicus*.

Of the first section there is but one species known: of the second there are six. None of the Genus appear to have been discovered in a fossil state.

Fig. 1. A young shell of *Melo Indicus*, (*V. Præputium*, Chemn. Gmel.)

2. A full grown, but not large shell of *Melo Indicus*, covered with its epidermis.

3. *Melo umbilicatus*, (Broderip,) N. S. in an intermediate stage of growth. In the full grown shell the whorls of the spire and body whorl project so much beyond the apex, that the latter is seen as it were at the bottom of an excavation.

## PULLASTRA.



*Venus*, Pars, Lam.

*Venerupis*, Lam.



**TESTA** æquivalvi, transversâ, inæquilaterali, latere antico brevior, dentibus cardinalibus in utrâque valvâ tribus contiguis, interdum apicibus subemarginatis. *Impressiones musculares* duæ, laterales, subrotundatæ. *Impressio* muscularis pallii sinu magno. *Ligamentum externum*, valvarum marginibus dorsalibus suboccultatum.



To say that *Linné* himself, could he have lived till the present time to know what we know, and to see what our eyes every day behold of the habits of the molluscous animals, would have acknowledged the necessity of establishing many of the new genera that have been founded since his time, is not to offer a very high compliment to his judgment as a naturalist. We go much further, for we say that the most bigoted of his followers, few of whom can suffer the establishment of a new Genus because not founded by *Linné*, can neither avoid being convinced of the necessity of several dismemberments to which the Linnean Genus *Venus* has already been subjected, nor deny the necessity of further subdivision. We have scarcely yet meddled with that intricate Genus,



## PULLASTRA.

and we now intend to confine our remarks more particularly to a small part of it, which has not yet been separated from it, except by Bruguière of whose *Capsa* the Genus we are now about to treat of forms a part. Lamarck has, indeed, constituted his *Venerupis* of a part of our Genus, but the greater number of its species are by him still left in *Venus*. The difficulty of ascertaining any distinguishing character between the Lamarckian *Venerupis* and the *Veneres*, *Pullastra*, *decussata*, and others, except in the apparent habits of the animals, has prevented us hitherto from endeavouring to clear up a point to which our attention has frequently been directed, but which we now think we have overcome. It is well known that *Venus perforans*, Mont. *Venerupis perforans*, Lam. and some of its congeners live in cavities perforated in chalk and limestone rocks, and that the *Veneres Pullastra*, *decussata* and several other species that resemble them in general form and appearance are found buried in the sand; an apparently well marked difference therefore exists in the habits of their respective animals: we think, however, that we have evidence to prove that there exists in reality very little difference, and that the cavities in which Lamarck's *Venerupes* live, are rather the natural consequence of the action of the sea water in conjunction with some of the excretions of the animal upon the chalk or limestone, than of any power of the animals themselves to pierce, independently of such action: so that the difference is really only in the nature of the shore on which the very young shells are accidentally deposited, those which are thrown upon a sandy bottom, burying themselves in the sand, and such as are deposited upon limestone or chalk producing a cavity in which they live.

The shells which we now propose to unite together under one appellation are Lamarck's *Venerupes*, and the following of his *Veneres*, viz. *V. Malabarica*, *papilionacea*, *adpersa*, *punctifera*, *turgida*, *litterata*, *sulcaria*, *Textile*, *texturata*, *geographica*, *rariflamma*, *decussata*, *Pullastra*, *aurea*, *virginea*, and some others: and for the Genus thus constituted we propose the name of *Pullastra*, rejecting the term *Venerupis* or *Venerirupis*, because it would convey the false idea that at least the greater number of the species were inhabitants of rocks.

**PULLASTRA.**

Shell equivalve, transverse, inequilateral, the anterior side being the shorter. Cardinal teeth three in each valve, placed near to each other, and generally having their terminations notched; in a few species the central tooth of one valve is deeply cloven. Muscular impressions two, lateral, roundish. Muscular impression of the mantle with a large sinus. Ligament external, partly concealed by the dorsal margins of the valves.

Several recent species of this Genus are common on our own and other European shores; others are brought from the East and West Indies; some are beautifully marked. Fossil species are scarce, and we believe are only found in the tertiary beds.

[illegible]

## TEREDINA,

Lam.



**TESTA** crassa, fistulosa, anticè sensim attenuata, aperta, aperturâ dissepimento subdivisâ, operculo unico nonnunquam oclusâ, posticè omnino clausa, valvis duabus (ut in *Teredinibus* conformatis) in externo tubi pariete conferrumnatis, intùs dente recurvo majore instructo; valvâ accessoriâ subquadratâ umboni anticè superimpositâ.



A very singular Genus only known in a fossil state, belonging to the *Tubicolæ* of Lam. and approaching in its characters to *Teredo*. In consequence of its general resemblance to that genus, we were at first disposed to have united them together, joining to them the *Fistulana gregata* of Lam.; but as the tube in *Teredina* never covers the two valves, but appears to be soldered to them, as in *Aspergillum*, we are constrained to regard it as a distinct Genus; of which, however, we only know one species at present, namely the *T. personata* of Lam. for we have already ventured to express our opinion that the shell described by Lam. under the name of *T. Bacillum* is not a *Teredina*, but may more properly be considered as a *Saxicava*. In many respects *Teredina personata* resembles the *Pholas papyracea* of Turton, and in others the *Ph. striata* of Linn.; from the latter, however, it differs in having a shelly tube which that has not, and from the former in having an operculum to cover the posterior aperture of the tube.

Shell consisting of a thick fistulous tube, smaller at the posterior end, which is open, nearly divided into two by a projection on each side within, and has an operculum, as we are informed, though we have never seen it, which covers the double opening: it is remarkable that the posterior smaller portion of the tube is of a very different substance and colour from the anterior and larger termination; it resembles horn in appearance

## TEREDINA.

while the anterior part and the two valves are like a soft shelly substance. In form the two valves exactly resemble those of *Teredo*; in *Teredina*, however, these are wholly external, and they are thickly lined as well as united to the tube by a continuation of the shelly matter of which the tube itself consists. The beaks or umbones of these two valves are very much incurved, and covered by a rather quadrangular thick accessory piece which appears to be fixed to the valves in front of the beaks; and there is an irregular prominence of the tube just behind the beaks. The anterior termination of the tube is completely closed by a trapezoidal piece which fills up the space left by the sinus in the two valves. The testaceous matter is generally so much increased in thickness internally, as nearly to obliterate or cover the internal appendages usually called the teeth, common to it and *Teredo*.

The *Teredina* appears to have been gregarious, as it occurs in numbers in a bed of ferruginous sand at the only place in which it has been found; there is no reason to doubt its habit of living in cavities of its own terebrating, but whether in wood or any other substance, we have not the means of ascertaining. That in its young state it is destitute of a tube, and consists only of the two valves and a membranaceous envelope we cannot doubt, and it appears to us probable that in this respect as well as in the habit of terebrating sandstone it is nearly analogous to the *Pholas papyracea*.\*

Fig. 1. *Teredina personata*, showing the ventral portion together with the double aperture.

2. The form of the aperture
3. The dorsal portion showing the beaks.
4. The same having the beaks covered with the accessory valve.

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\* For notwithstanding the opposition which our opinion formerly expressed has met with, we must still maintain that the *Ph. lamellata* of Turton is only the young of *Ph. papyracea*.

## XYLOPHAGA.



**TESTA** orbicularis, æquivalvis, inæquilateralis, anticè hians, (hiatu posticè angulato) valvis accessoriis duabus, subtrigonis, fornicatis, dente cardinali minuto et costâ, in utrâque valvâ, internâ ab umbone ad marginem basalem decurrente; impressionibus muscularibus binis, posticâ magnâ, obovatâ; anticâ minore, margini superiore impositâ.



WE are obliged to Dr. Turton for his very liberal communication of several specimens of this new and very interesting Genus, as well as for the discovery and first description of it. A single specimen has also occurred in a piece of stick thrown up at Gravesend, for the use of which we are obliged to Mr. Crouch.

The two valves approach very much in form to those of *Teredo*; there are, however, two or three characters by which *Xylophaga* may be distinguished from that Genus; these are, the want of a shelly tube and of those internal appendages common to *Pholas* and *Teredo*, generally called teeth, and the addition of two small accessory valves; it appears also to be destitute of the spatulate opercula found in the *Teredinæ*.

Shell nearly orbicular, equivalve, valves inequilateral, gaping in front, the opening having an angular termination at the back. Two small, rather triangular, calyciform accessory valves are placed over the anterior side of the hinge, and there is a small curved tooth lying close to the umbo within in each valve; as well as an internal rib running from the beak to the basal margin with a corresponding depression on the outside. The posterior muscular impression is large and obovate; the

## XYLOPHAGA.

anterior smaller, placed on the superior margin close to the beak.

This Genus, of which only one species is at present known, pierces wood, to the depth of from half an inch to an inch, where it forms a clavate tube, without any lining; and as we are informed by Dr. Turton, its animal fixes itself by a fleshy disk to the lower part of the tube. We think, that on account of its having anterior accessory valves, and its not being possessed of the two opercula and the shelly tube, it must be regarded as more nearly related to *Pholas* than to *Teredo*.

The specimens sent to us by Dr. Turton were discovered in a part of wreck dredged up near Berry Head.



## VOLUTA.



**TESTA** subovata, coloribus plerumque variis eximiè picta. Apex papillaris. Columella plicata, plicis inferioribus maximis, basi emarginata. Epidermis tenuis, fusca.

Animal carnivorum. Caput tentaculis 2 instructum. Oculi ad tentaculorum basin externam appositi. Pes maximus. Operculo caret.\*

Habitat marinum in calidioribus mundi veteris regionibus, rarius in Indis occidentalibus.



**SHELL** inclining to oval, elegant in form, and, in the majority of species, beautifully pencilled with variegated colours. Apex of the spire papillary, more solid than that of Melo. Pillar plaited, (the lowest plaits being the largest, and most oblique,) and notched at the base. Epidermis thin, varying from greenish to brown.

Animal carnivorous. The head furnished with two tentacula, at the external bases of which are the eyes. Foot very large. No operculum.

Inhabits the seas of the warm countries of the old world; and is found, but much more rarely, in those of the new.

There is reason to believe that the genera *Cymba*, *Melo* and *Voluta* are viviparous. Fossil species of the latter genus occur, above the chalk, in the crag, in the London clay and in the calcaire grossier at Grignon, Courtagnon, &c. In the chalk no trace of the genus has, I believe, been noticed: and, below the chalk, it appears to have been only observed in the Cornbrash.†

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\* I have had no opportunity of examining the soft parts of a *Voluta*, but the gradations from the shell of *Melo* to that of *Voluta* are so gentle, that I have little hesitation in giving the above as the leading characters of the animal.

† See Conybeare and Phillips, part 1. p. 210.

## VOLUTA.

The animals characterized by Linné as *Volutæ*, form rather a heterogeneous assemblage. Mollusca whose branchial system allows them to respire nothing but water;—others which breathe air, and to which submersion in water for any length of time would be fatal;—animals phytiphagous and carnivorous, terrestrial, fresh water and marine—will be found ranged as congeners in the *Systema Naturæ*.

But the student must pause before he censures one to whose zeal and acuteness we owe so much. Considering the dim light by which Linné studied Nature, we cannot withhold our admiration of the grandeur of his mind and of the monument which it raised. Had this great man been acquainted with the habits and comparative anatomy of the Mollusca, it would hardly have been left first to Bruguière, and afterwards to Lamarck to reform the genus *Voluta*. What was dark to him, modern discovery enlightened for the later philosophers: they have convinced us that the light did not shine in vain; and to them we owe a distribution of the Linnean *Volutæ* into genera, which appear to form more natural associations.

The genus *Voluta* of Lamarck, has been still further reduced by the author of this sketch, by taking from it the genera *Cymba* and *Melo*; and the crowd of species which are still ranked under our genus will, it is submitted, afford to those who study the subject, pregnant evidence that even a further division will soon be called for. Take, for example, *Voluta imperialis* and *V. lyriformis*, and we shall find some difficulty in satisfying the enquirer that they are species of the same genus. In the present state of the science, it is however only proposed thus to subdivide the genus:

\*

Papillâ grandi, lævi,

α

Coronatae

Exemp. *Voluta imperialis*, (Icon. Encyc. Method. tab. 382. fig. 1.)

β

Inermes.

Exemp. *V. Scapha* (Encyc. Method. tab. 391.)

## VOLUTA.

\*\*

Papillâ tuberculatâ.

Vespertiliones.

Exemp. V. rutila, (Icon. Zool. Journ. vol. II. tab. 3.

\*\*\*

Papillâ lævi, mediocri, subacutâ.

 $\alpha$ 

Ventricosiores.

Exemp. V. marmorata, (Icon. Swainson, Exotic  
Conch. part, 1.) $\beta$ 

Graciliores

Exemp. V. Lapponica (Icon. Encyc. Method. tab. 381.  
fig. 3. a. b.) $\gamma$ 

Musicales.

Exemp. V. Musica, (Icon. Encyc. Method. tab. 380,  
fig. 1. a. b.)

\*\*\*\*

Papillâ truncato-papillari.

Mammillares.

Exemp. V. papillaris, (papillosa, Swainson,) Icon.  
tab. nost.

\*\*\*\*\*

Papillâ acutiusculâ.

Mitriformes.

Exemp. V. lyriformis, († Mitra lyræformis, Swainson,)   
Icon. Zool. Ill. tab. 54. Zool. Journ. III. tab. 4. fig. 1.

† Mr. Swainson first described the two last mentioned species; and the slight alterations here given in the trivial names, are only to be considered in the light of corrections of the press. The latter shell is figured and described in the Zoological Illustrations as a Mitra; but Mr. Swainson has expressed to me, since that publication, his conviction that the shell is a Volute; indeed the increased size of the lowest plaits of the pillar puts the matter out of doubt.—  
See Zool. Journ. vol. III. p. 83. W. J. B.



## TEREDO.



**TESTA** orbicularis, æquivalvis, inæquilateralis, utrâque extremitate hians, (hiatu antico posticè angulato, altero anticè rotundato) anticè subalata, *impressione musculari* anticâ alæ impositâ; dente elongato, sub umbone internè recurvo: tubo postico, accessorio, longissimo, calcareo, anticè rariùs clauso, plerumque aperturâ rotundâ, posticè in tubos duos diviso, operculis duobus palmatis, aliquando pennatis instructo.



IN our last number we considered ourselves obliged to establish three new Genera, at the same time expunging one of those formerly published by Lamarck, so that in reality we only added two to the Lamarckian list. In the 26th number we expressed our opinion that Lamarck's *Fistulana gregata* might be added to his Genus *Teredina*, upon a more careful examination we are now disposed to abandon that opinion, and to unite Lamarck's *Septaria*, together with his *Fistulana gregata*, with *Teredo*, thereby lessening the number of genera by one because we do not think there exist any characters by which they can be distinguished; which we will endeavour to show by a recapitulation of the characters in which Lamarck makes their distinctions to consist, together with our reasons for regarding them as inconclusive. *Teredo*, according to Lamarck, has a flexuous, cylindrical, shelly tube, open at both ends, distinct from the shell, and covering the animal; and its shell consists of two valves, placed without the tube at the posterior extremity. The character of Lamarck's *Septaria* are, a very long shelly tube, gradually attenuated towards the anterior (which should be posterior) part, and divided interiorly by several,

## TEREDO.

mostly incomplete, vaulted septa; its anterior (posterior) extremity being terminated by two other, more slender tubes, which are not internally divided. Thus we find that in the shelly tube itself, and in the position of the two valves with respect to that tube, his descriptions of the three genera accord; and that his dependence for a character to distinguish *Septaria* from *Teredo* is placed upon the *vaulted septa* of the former, which, however, to our certain knowledge, occur more frequently in *Teredo* than in *Septaria*. With regard to Lamarck's *Fistulana gregata*, it appears to us to differ from his descriptions of *Teredo* and *Septaria* only in having the lower end of the tube closed; in this regard, however, we shall find that it disagrees neither with *Septaria* nor *Teredo*, both of which occasionally close the lower end of the tube; for particular proof of this fact we refer to Mr. Griffith's and Sir Everard Home's papers on the subject in *Philosophical Transactions* for 1806, part 2, where also will be found a detailed anatomical description of the animal. The always more or less double posterior aperture of the tube, closed in different species by variously formed double opercula, together with the resemblance in general characters above pointed out, seem to us therefore sufficient reasons for uniting *Fistulana gregata*, and the *Septaria* of Lam. with *Teredo*; of which we shall now give the generic character.

Shell orbicular, equivalve, inequilateral, with a subalate process in front, gaping at both extremities, the anterior opening angular at the back, the posterior rounded in front. Anterior muscular impression placed upon the subalate process. An elongated tooth is conspicuously seen curved out from under the umbones within each valve. With this shell, which contains the anterior extremity of the animal, it perforates wood in an irregular manner to a considerable depth, lining the perforations as it proceeds with a calcareous, proportionately elongated, accessory tube, which is seldom closed anteriorly, but has for the most part a round aperture, and which is divided posteriorly into two tubes, which can be closed at the will of the animal by two palmate, sometimes pennated opercula.

# MULLERIA,

*De Ferussac.*



**TESTA** irregularis, inæquivalvis, inæquilateralis, foliacea, ostreiformis, valvâ alterâ externè fixâ; *impressione musculari* unicâ, propè extremitatem posticam (i. e. dorsalem) positâ; *impressione musculari* pallii irregulari: ligamento dorsali elongato, externo, in sinum posticum decurrente: umbonibus anticis, sublateralibus.



ONE of the most singular and rare of known genera, not noticed by Lamarck, and only very recently remarked by De Ferussac among the specimens of *Ætheria*, in the Duke of Rivoli's collection. The two specimens that exist in Paris, and the individual in my Brother's collection, being all that are known at present. The Genus is remarkable as being intermediate in its structure, between *Ætheria* and *Ostrea*, and as apparently connecting the regular fresh water bivalves ("the *Naiads*" of Lam.) with the irregular marine bivalves, (*Ostrea*, for example,) and with the genus *Ætheria*, inasmuch as in the sinus at the posterior extremity of the ligament it resembles the *Naiads* and the *Ætheria*; and in its single muscular impression, as well as its general form it approaches to *Ostrea*.

The following are the characters of the Genus; it is an irregular, inequivalve bivalve, adhering by the outside of one valve: the structure of the outside of the shell is foliaceous, but the foliations are closely pressed, and do not form any murications or other rugosity on the surface; the inside has a thin pearly coat of a glaucous green colour, and partly iridescent. It has only one muscular impression in each valve, which is placed near the back and towards the posterior extremity, and from one corner of



## MULLERIA.

which passes the muscular impression of the mantle, towards the anterior part of the shell: in our specimen the muscular impression of the mantle is irregular and indistinct. The ligament is rather elongated, external, its posterior termination, however, fills a sinus in the edge of the shell, apparently formed to receive it, and in this respect it approaches very closely to the *Naiads*, while it differs materially from the *Ostrea*. The beak is rather pointed, anterior and lateral in our specimen. A dull yellowish brown epidermis covers those parts of the shell which have not been exposed to attrition.

## DOLIUM.



**TESTA** subovalis, ventricosissima, tenuis, plerumque transversim costata vel sulcata, spirâ brevissimâ, aperturâ maximâ, in canalem brevem, reflexam desinente; labio externo sæpius tenui, interdum margine reflexo, crenato: epidermide tenuissimâ, corneâ, indutâ.



ONE of the best marked Genera that has been established, for though it is not difficult to recognize its immediate general relation to *Cassis*, it is, nevertheless, easily distinguished from that, and we do not know any other Genus to which it bears a near affinity. It is true it resembles *Harpa* in general form, and has been arranged together with that and *Cassis* among the *Buccina* by Linneans; the differences, however, are so great that there can be no danger of their being confounded. We regret that we have never seen the animal of any of these three Genera, it is, however, more than probable that they will be found to accord very nearly in their characters with the *Buccinidæ*. We are of course ignorant whether or not they have an operculum.

The species of the Genus *Dolium* are of an elliptical shape, nearly approaching to globular, being exceedingly ventricose; they are thin, even when very large; on the outside they are always more or less strongly ribbed or grooved, the ribs or grooves being transverse to the apex; spire very short, its apex when complete being in general semitransparent, of a yellowish colour and apparently different substance from the rest of the shell. Aperture very large, terminated at the base by a short reflected canal. Outer lip mostly thin, sometimes, however, it has

## **DOLIUM.**

a thickened, reflected and crenated edge. A thin, horny epidermis generally covers the outside of the shell.

The species of this Genus are not numerous, nor are they rare; some of them grow to an enormous size, and they are then handsome ornamental shells. Fossil species are very uncommon, nor can we with certainty assert their existence. There is in the chalk a shell having nearly the general form of a Dolium, but its characters are not sufficiently developed in the specimens we have seen to enable us to judge with certainty.

## TEREBRA.



**TESTA** elongata, subulata, anfractibus numerosis, gradatim majoribus, aperturâ brevi, oblongâ, in canalem brevem, rectam desinente; columellâ contorta, spirali: operculo corneo, non spirali.



THOUGH it may be difficult in some instances to establish the distinctions between the *Terebra* of Bruguière and *Buccinum*, it may nevertheless be convenient to retain it in the list of Genera, because, for the most part, the species composing it may be regarded as forming a very well marked natural group. It is not difficult to distinguish the *Terebræ*, (*Vis* of the French, *Needles* of the English Collectors) at first sight from the *Turritellæ*, which they closely resemble in general form, by the short canal at the base of the aperture, and by the more or less twisted columella. The operculum also is very different, being rather thick, oblong, somewhat pointed at the base and not spiral; whereas that of *Turritella* is thin, nearly circular and spiral. It is seldom, however, that this character can be brought to our aid, as the opercula of the *Terebræ* are rarely preserved. It is not, moreover, certain that all the shells that have been admitted into the Genus are furnished with an operculum, for Lamarck asserts, as he says, upon the authority of Adanson, (though we cannot find any expression in Adanson in support of this assertion) that this Genus has no operculum. This assertion, however unsupported by the authority referred to, may perhaps refer to some species which seem to be peculiar to the African shores, and which we think might with propriety be separated from the *Terebræ*.

Shell much elongated, subulate, sharp-pointed, in general composed of a considerable number of volutions,

## TEREBRA.

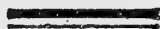
which increase gradually in size; aperture seldom exceeding one-third of the length of the shell, for the most part much shorter, oblong, with a short straight canal at the base: columella oblique and spiral or twisted, often striated.

The recent species of this Genus are numerous, we possess about an hundred; some of them are very beautiful: they are principally brought from the East and West Indies, and from South Africa: very few are European. Several fossil species occur in the newer formations, at Piacenza, Bordeaux, Turin, &c. they are more scarce in the London clay.

## FASCIOLARIA.



**TESTA** elongata, fusiformis, spirâ longitudinem canalis æquante; canali elongato, recto; basi columellæ pliciferâ, plicis tribus vel quatuor, obliquis, inferioribus majoribus; operculum corneum, ovale, internè acuto.



ONE of the genera which was formerly united with *Murex*, but apparently separated from it with propriety: and easily distinguished by its spire and canal being nearly of equal length and by its being destitute of varices. From *Fusus*, however, it is not so easily distinguished, being of the same general form and having nearly the same external appearance; the want of oblique folds at the base of the columella in *Fusus* is the only character in which they differ: in *Fasciolaria*, these folds are very oblique, three or four in number, and the lower are the larger; we must not, however, omit to mention some shells which may be confounded with *Fasciolaria*, and which, on account of their having some small folds near the base of the columella, have apparently caused much difficulty, some of them having been placed in *Turbinellus*, others in *Fasciolaria*, and others in *Fusus*; and having also been occasionally transferred from one to another: the folds in these are very small, and they are moreover horizontal; we would suggest the propriety of uniting the shells possessing these characters, should they be found to agree in other particulars, under a new generic appellation. The genuine *Fasciolaria* may be distinguished from the *Turbinelli* also, by the obliquity of the folds and by the circumstance of the lower being the larger.

Shell elongated, fusiform, with its spire generally equal in length to the canal which is produced and nearly straight, with three or four oblique folds at the base of

## FASCIOLARIA.

the columella, the lower being the larger. Operculum horny, thickish, of an oval shape, pointed at the inferior extremity.

The recent Fasciolariaë are not numerous, the East and West Indies, however, furnish several species which are rather handsome shells. The *F. Tulipa*, which is one of the most beautiful, is not uncommon among the West Indian Islands. In delicacy and beauty of colouring there are few shells that exceed the *F. distans* when in fine condition. The *F. aurantiaca*, which we have figured is one of the most remarkable as well as one of the rarest. All the species we know are marine, and furnished with an epidermis.

Fig. 1. *Fasciolaria aurantiaca*.

2. Operculum of the same.



## MUREX.



**TESTA** oblonga, subturrita, spirâ plerumque prominulâ, apice acuto; varicosa, varicibus tribus vel plurimis, plerumque digitatis, vel muricatis, vel spinosis, vel fimbriato-laceris; aperturâ suborbiculari; columella lævi; canali longiusculo (nonnunquam longissimo) interdum recurvo; operculo corneo.



THE great diversity of character observable in the numerous shells which compose the Linnean *Murex*, and the consequent impossibility of constructing a *character generis* that should identify all, has naturally led to the separation of several kinds of shells from it, when their characters were sufficiently distinct to admit of definition, such for instance as *Cerithium*, *Ricinula*, *Triton*, *Fusus*, *Ranella*, &c. These curtailments have necessarily rendered the definition of *Murex* much more easy and precise; the *Makers of Genera* have not however been satisfied, but have seen characters sufficiently strong in their opinions at least to raise to the rank of genera, the *M. Haustellum* on account of its remarkably elongated canal; the *M. tenuispinosus* on account of its long slender spines running in three rows down its lengthened canal, and others; we cannot however approve of such innovations, because we think their object is fully attained by the division of the genus according to the various types at present contained in it; not that we mean to say that every species enumerated by Lamarck under the *Murex* is properly so placed, because we are aware that some of them belong to other established genera; these of course should be struck out from among the *Murices* and restored to their proper places wherever they may be found; if however upon such circumstances

## MUREX.

as we have mentioned above, we are to be authorized to establish new genera, we are convinced that the number of genera would shortly become equal to that of species.

We would now limit the genus *Murex* to those species with a more or less oblong, subturreted shell, a generally rather prominent spire with an acute apex, and three or more rows of varices that are more or less digitated or muricated or spinose, or with an irregularly foliaceous or lacerated fringe; a suborbicular aperture, a smooth columella, a generally lengthened, sometimes very long, frequently recurved canal, and an horny operculum.

The characters in which these will be found to differ from those other genera which have been united with *Murex* are as follows: they may be distinguished from *Fasciolaria* and *Fusus* in the general form, and in being furnished with muricated varices which those two genera have not; from *Triton* in the smooth columella which in *Triton* is rugose, and in the number of varices, which in *Murex* are never less than three; from *Ranella* because that genus has only two rows of varices, and rugose a columella; from *Ricinula*, in general form and in their lengthened canal; and from *Cerithium* in the proportion of the spire which in this latter genus is much longer than the aperture.

We think that Lamarck should not have admitted the *M. magellanicus* and *M. lamellosus* among his Murices, because they rather belong to *Fusus*, being sometimes free from varices, which are never muricated: they agree moreover in their other characters more nearly with *Fusus*. His *M. crispatus* is probably a *Purpura*.

The species of the Genus *Murex* are numerous, many of them are very beautiful and singular. The longpointed and regularly arranged spines on *M. tenuispinosus*, *Lam.* (commonly called Venus' Comb) renders it an extremely interesting and delicate object: *M. Scorpio* is remarkable for the dilated apices of its fronds; *M. Radix* for its fine black short spines; *M. regius* for its brilliant crimson coloured aperture; *M. Cervicornis* for the forked points of its larger fronds; *M. Palma-rosæ* for the delicately tinted tips of its finely toothed fronds; and *M. Haustellum* for its uncommonly lengthened canal: these are mostly tropical species, but the genus is found in all countries: it is marine and is naturally furnished with an epidermis,

MUREX.

though this is commonly cleaned off before these shells come into the market.

Of Fossil species there are also many generally belonging to the tertiary beds.

There is a circumstance of unusual interest to be observed in the manner in which the animal increases the size of its shell, and which shows most admirably the regularity and beauty of the laws of Nature, and directs the mind to the contemplation of the wisdom and power of the CREATOR, who alone could teach these little animals how to construct an habitation so perfectly adapted to their circumstances and situation: It will be observed that each periodical increase of these shells consists of a piece which surrounds about a third part or less of the lower portion of the last volution already formed, which portion is always terminated by a varix, which is more or less muricated and even spinose; it is obvious that these murications or spines must be in the way of the future increase of the shells, unless they could be removed from that part which it is intended to cover, the animal therefore is furnished with the means, probably by a solvent liquor, of eating away the lower part of these spines, so that they become detached and fall off by the time that he is ready to form his new inner lip upon the space which they occupy, thus forming a comparatively smooth and even surface on which it is to spread the testaceous matter of which the addition to his building is composed.

In our plates we have given figures of some of the species which show the greatest diversity of character.

- Fig. 1 Murex Haustellum.  
2 ——— tenuispinosus.  
3 ——— Scorpio.  
4 ——— cervicornis.  
5 ——— phyllopterus.  
6 ——— melanamathos.



## TRITON.



**TESTA** oblonga, varicosa, varicibus raris; spirâ prominulâ, apice acuto; aperturâ suborbiculari; labio externo incrassato, reflexo, columellari rugoso; canali longiusculo, subrecurvo; epidermide distinctâ, plerumque pilosâ; operculo corneo.



WE think that the Triton may be considered as a natural genus, because the shells which compose it resemble each other pretty nearly in general appearance. They have been arranged by Linneans with the Murices, and some species appear to connect these two genera together; the principal marks of distinction being in the number of varices, which are more frequent in Murex than in Triton; and in the rugosity of the inner lip, which is scarcely ever to be observed in Murex.

The Tritones are of an oblong form, with a rather prominent spire, acute at its apex; varices, never more than two in a whorl, ornament the outside; aperture nearly round, outer lip thickened, reflected; inner lip rugose; canal somewhat elongated, and turned backwards. A strong horny epidermis naturally coats the Tritones; and this epidermis is often fringed with strong hairs. Operculum horny.

The species of this genus are not very numerous, they occur in the seas of warm climates, particularly in the East and West Indies, and among the Islands of the South Seas. Some large species also abound in the Mediterranean; and it appears very probable that one of these is the shell from whose animal the ancients obtained

## TRITON.

the celebrated Tyrian purple, whence it was denominated *Purpura*. The *Triton variegatus* is much valued by the inhabitants of some of the South Sea Islands.

Of fossil species there are very few, those with which we are acquainted are only found in the newest or tertiary beds, above the chalk; as in the London clay, and in its contemporaneous formations, in the green sand, &c.

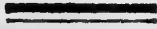
We have represented in our plate the following species, which show the principal variations in general form to which the genus is subject; the *Tr. Anus* being one of the most remarkable.

- Fig. 1. *Triton australis*.  
2. ——— *clandestinus*.  
3. ——— *Clavator*.  
4. ——— *Lotorium*.  
5. ——— *Anus*.  
6. ——— *cutaceus*.

## CLAUSILIA.



**TESTA** elongato-turrita, apice obtusiusculo, anfractibus plurimis gradatim majoribus; aperturâ plerumque plicis dentiformibus munitâ, intus ossiculo testaceo, elastico, sive clausio instructâ; peritremate continuo, libero, reflexo.



It appears that Draparnaud was not the first discoverer of the little opercular clausium that has given a name to this genus, but that it had been already observed and described by Daubenton; several persons may however with equal propriety claim the honour of the discovery, having each described it without being aware that it had been already noticed.

The species of this genus have, by Linneans, been arranged with Turbo, not however with much appearance of reason, because the aperture is not round; Bruguière with more reason, united it to Bulimus, to which indeed it is nearly related, but from which it may nevertheless be distinguished by its continuous, free peritreme, and by the clausium.

This genus, which is terrestrial, consists wholly of small shells, the largest species we know scarcely exceeding an inch in length; several of the species are common in this country; in the Southern parts of Europe, particularly the Islands of the Mediterranean they appear to abound to profusion.

Shell turrited, elongated, consisting of many volutions, rather blunt at the apex, swelling gradually towards the lower part: the aperture generally has several columellar and other tooth-like plaits: and within there is a little elastic shelly bone attached to the columellar teeth, commonly termed the *clausium*, and from which



## CLAUSILIA.

the genus takes its name; and whose function appears to be to close up the aperture when the animal has withdrawn itself within the shell. Peritreme continuous, free all round, reflected: in which respect it accords with some of the Pupæ; these latter are however destitute of the clausium. Many of the species are longitudinally striated on the external surface; this, however, is not the case with all. We have represented two or three of the species that differ most in general appearance.

*Cl. Macascarensis*, a new and very rare species lately discovered in Hungary.

*Cl. labiata*. *Turbo labiatus*, Mont. from Malta, a species that has been published as British, in our opinion without sufficient reason.

*Cl. torticollis*.

A section showing the Clausium is shown at Fig 1.

## TELLINA.



**TESTA** transversa, subæquivalvis, inæquilateralis, latere antico plerumque rotundato, postico subrostrato, anguloso; margine ventrali anticè irregulariter flexuoso: dentibus in utrâque valvâ, cardinalibus plerumque duobus, lateralibus duobus, nonnumquam oblitteratis, plerumque remotis; *impressionibus muscularibus* duabus remotis; *impressione musculari pallii* sinu maximo.



**THE** irregular flexuosity of the anterior ventral margin appears to have been constantly regarded as the principal distinguishing character of this beautiful genus, and when we consider the number of species possessing this character, and agreeing also in other general circumstances, it may perhaps be still considered as the essential character of the genus. This remark is rendered important by the fact of the existence of a number of shells bearing a general resemblance to Tellina, in which, however, this flexuous fold is not observable; we allude to the Lamarckian genus *Tellinides* which some Naturalists would re-unite to Tellina: whether or not there is sufficient reason for the separation we will not attempt to decide, but shall point out to our readers the peculiarities of both, commencing with Tellina.

Shell transverse, generally nearly equivalve, inequilateral; anterior side generally rounded, posterior somewhat beaked, angular; anterior ventral margin with an irregular flexuosity; cardinal teeth in each valve generally two, sometimes only one; lateral teeth in each valve two, in some instances scarcely perceptible, gene-

## TELLINÆ

rally distant from the cardinal: muscular impressions two, distant; that of the mantle with a very large sinus.

It will be observed that Lamarck proposes as the characters which are to distinguish *Tellenides* from *Tellina*, *First*, the absence of the flexuous fold; *Secondly*, the want of lateral teeth; and *Thirdly*, the apparent existence of three hinge teeth; we must, however, remind our readers, that among the shells arranged by Lamarck among his *Tellinæ* there are some without lateral teeth, but which possess the flexuous fold; there are others with very slight indications of this flexuous fold, and in which there is only one lateral tooth and that placed near to the cardinal teeth; now instead of three hinge teeth in *Tellinides* there are in reality but two, and the tooth that appears as a third hinge tooth is only a lateral tooth placed very close to the cardinal teeth; thus there appears to be in reality a very natural and easy transition from the genuine *Tellinæ* with a flexuous fold and two lateral teeth, to the *Tellinides*, apparently without either.

Of the *Tellinæ* there are many species, some of a form very much elongated in a transverse direction, as the *rostrata*, *Spengleri*, &c.; others that are of an oval shape, some of which are rough on the outside, as the *T. Lingua-Felis*; others again that are nearly orbicular, as the *T. scobinata*, *T. carnaria*, &c. very few have one valve more flat than the other, as *T. opercularis*; both valves of others are remarkably deep, as *T. lacunosa*. Many of the species are very brilliant in their colouring. The *Tellinæ* are marine, living in the sand near the shore, where they are commonly the prey of *Aporrhaides*, *Buccina*, and other carnivorous *Trachelipodes*, who pierce the shell to devour the inhabitant.

The fossil species are not numerous, they are only found in the newer tertiary beds.

## TELLINIDES.



**TESTA** transversa, subæquivalvis, inæquilateralis, planulata, latere antico plerumque rotundato, postico subrostrato, anguloso; dentibus cardinalibus in utrâque valvâ duobus; dente laterali in alterâ valvâ, postico, propè cardinalibus proximè admoto: *impressionibus muscularibus* duabus, distantibus; *impressione musculari* pallii sinu maximo.



**AFTER** the observations we have made under *Tellina*, we need here only add that the number of shells that may be arranged under Lamarck's *Tellinides* is rather considerable, although Lamarck has mentioned only one. They are found in the same situations as the *Tellinæ*.

Shell transverse, nearly equivalve, inequilateral, flattened, anterior side generally rounded, posterior somewhat beaked and angular: two cardinal teeth in each valve, and a single lateral tooth in one valve closely approximated to the cardinal teeth: muscular impressions two, distant: that of the mantle having a very large sinus.

# ESTIMATE

No.		Description		Unit	Quantity	Unit Price	Total
1		Excavation		cuyd	100	1.50	150.00
2		Foundation		sq ft	100	2.00	200.00
3		Concrete		cuyd	100	3.00	300.00
4		Reinforcement		lb	100	4.00	400.00
5		Formwork		sq ft	100	5.00	500.00
6		Brickwork		sq ft	100	6.00	600.00
7		Masonry		sq ft	100	7.00	700.00
8		Plumbing		hr	100	8.00	800.00
9		Electricity		hr	100	9.00	900.00
10		Painting		sq ft	100	10.00	1000.00
11		Roofing		sq ft	100	11.00	1100.00
12		Landscaping		sq ft	100	12.00	1200.00
13		Interior Finishing		sq ft	100	13.00	1300.00
14		Exterior Finishing		sq ft	100	14.00	1400.00
15		Site Preparation		sq ft	100	15.00	1500.00
16		Foundation		sq ft	100	16.00	1600.00
17		Concrete		cuyd	100	17.00	1700.00
18		Reinforcement		lb	100	18.00	1800.00
19		Formwork		sq ft	100	19.00	1900.00
20		Brickwork		sq ft	100	20.00	2000.00
21		Masonry		sq ft	100	21.00	2100.00
22		Plumbing		hr	100	22.00	2200.00
23		Electricity		hr	100	23.00	2300.00
24		Painting		sq ft	100	24.00	2400.00
25		Roofing		sq ft	100	25.00	2500.00
26		Landscaping		sq ft	100	26.00	2600.00
27		Interior Finishing		sq ft	100	27.00	2700.00
28		Exterior Finishing		sq ft	100	28.00	2800.00
29		Site Preparation		sq ft	100	29.00	2900.00
30		Foundation		sq ft	100	30.00	3000.00
31		Concrete		cuyd	100	31.00	3100.00
32		Reinforcement		lb	100	32.00	3200.00
33		Formwork		sq ft	100	33.00	3300.00
34		Brickwork		sq ft	100	34.00	3400.00
35		Masonry		sq ft	100	35.00	3500.00
36		Plumbing		hr	100	36.00	3600.00
37		Electricity		hr	100	37.00	3700.00
38		Painting		sq ft	100	38.00	3800.00
39		Roofing		sq ft	100	39.00	3900.00
40		Landscaping		sq ft	100	40.00	4000.00
41		Interior Finishing		sq ft	100	41.00	4100.00
42		Exterior Finishing		sq ft	100	42.00	4200.00
43		Site Preparation		sq ft	100	43.00	4300.00
44		Foundation		sq ft	100	44.00	4400.00
45		Concrete		cuyd	100	45.00	4500.00
46		Reinforcement		lb	100	46.00	4600.00
47		Formwork		sq ft	100	47.00	4700.00
48		Brickwork		sq ft	100	48.00	4800.00
49		Masonry		sq ft	100	49.00	4900.00
50		Plumbing		hr	100	50.00	5000.00
51		Electricity		hr	100	51.00	5100.00
52		Painting		sq ft	100	52.00	5200.00
53		Roofing		sq ft	100	53.00	5300.00
54		Landscaping		sq ft	100	54.00	5400.00
55		Interior Finishing		sq ft	100	55.00	5500.00
56		Exterior Finishing		sq ft	100	56.00	5600.00
57		Site Preparation		sq ft	100	57.00	5700.00
58		Foundation		sq ft	100	58.00	5800.00
59		Concrete		cuyd	100	59.00	5900.00
60		Reinforcement		lb	100	60.00	6000.00
61		Formwork		sq ft	100	61.00	6100.00
62		Brickwork		sq ft	100	62.00	6200.00
63		Masonry		sq ft	100	63.00	6300.00
64		Plumbing		hr	100	64.00	6400.00
65		Electricity		hr	100	65.00	6500.00
66		Painting		sq ft	100	66.00	6600.00
67		Roofing		sq ft	100	67.00	6700.00
68		Landscaping		sq ft	100	68.00	6800.00
69		Interior Finishing		sq ft	100	69.00	6900.00
70		Exterior Finishing		sq ft	100	70.00	7000.00
71		Site Preparation		sq ft	100	71.00	7100.00
72		Foundation		sq ft	100	72.00	7200.00
73		Concrete		cuyd	100	73.00	7300.00
74		Reinforcement		lb	100	74.00	7400.00
75		Formwork		sq ft	100	75.00	7500.00
76		Brickwork		sq ft	100	76.00	7600.00
77		Masonry		sq ft	100	77.00	7700.00
78		Plumbing		hr	100	78.00	7800.00
79		Electricity		hr	100	79.00	7900.00
80		Painting		sq ft	100	80.00	8000.00
81		Roofing		sq ft	100	81.00	8100.00
82		Landscaping		sq ft	100	82.00	8200.00
83		Interior Finishing		sq ft	100	83.00	8300.00
84		Exterior Finishing		sq ft	100	84.00	8400.00
85		Site Preparation		sq ft	100	85.00	8500.00
86		Foundation		sq ft	100	86.00	8600.00
87		Concrete		cuyd	100	87.00	8700.00
88		Reinforcement		lb	100	88.00	8800.00
89		Formwork		sq ft	100	89.00	8900.00
90		Brickwork		sq ft	100	90.00	9000.00
91		Masonry		sq ft	100	91.00	9100.00
92		Plumbing		hr	100	92.00	9200.00
93		Electricity		hr	100	93.00	9300.00
94		Painting		sq ft	100	94.00	9400.00
95		Roofing		sq ft	100	95.00	9500.00
96		Landscaping		sq ft	100	96.00	9600.00
97		Interior Finishing		sq ft	100	97.00	9700.00
98		Exterior Finishing		sq ft	100	98.00	9800.00
99		Site Preparation		sq ft	100	99.00	9900.00
100		Foundation		sq ft	100	100.00	10000.00

## MITRA.



**TESTA** elongata, acuta, spirâ longitudinem aperturæ plerumque superante; aperturæ basi emarginatâ; canali brevi; columellâ plicatâ, plicis inferioribus minoribus.



ONE of the very distinct genera that had long been united with *Oliva* and *Columbella* under the Linnean genus *Voluta*, but which has been judiciously separated by late authors. Its characters, indeed, rendered it so obviously distinct from the genuine *Volutæ*, that former writers had also raised it to the rank of a genus which it deservedly holds. Of all the genera, with which it was originally united, it is not in danger of being confounded with any, except, first, with *Marginella*, on account of similarity in the plaits of the columella, but it may be known by the characters of the outer lip, which in *Marginella* is thickened at the edge and reflected; secondly, with *Columbella*, to which indeed some of the species seem to lead by almost imperceptible degrees; there is however one circumstance by which they may be distinguished; namely, the regular plicæ on the columella of the *Mitres*. This may be regarded as the essential character of the genus *Mitra*, by which it is also distinguished from the Lamarckian *Volutes*.

A late Author, to whom the Scientific Public are much indebted for one of the best executed works, connected with the illustration of Zoology, has separated a few small species from the Lamarckian *Mitres*, on account of their conical form, under the generic appellation of *Conohelix*. We cannot accede to this separation, because, the difference is only in general form and is altogether so slight that we cannot tell to which of the two genera, if they were separated, certain species must be referred; the

## MITRA.

form of different individuals of the same species is moreover subject to great variation, the spire in some specimens having double the length which it has in others.

The Mitres have in general an elongated form, and are pointed at the apex; the length of the spire is for the most part greater than that of the aperture; the aperture itself is elongated, longitudinal, notched at the base, and has a very short canal; outer lip generally rather sharp edged, sometimes however it is a little thickened, crenulated, and even furnished with a blunt tooth at the upper part within. Columella plaited, plaits sharp-edged, the inferior ones smaller. A thin, horny epidermis usually covers the outside; we have never seen any operculum.

The Mitres are for the most part inhabitants of the Seas of warm climates, and particularly of the East Indies, which furnish by far the greater number; it is probable that there exist three times as many recent species as are described in books; many of them are very beautifully coloured, and we may add that few are common shells. The fossil species are also numerous, they occur in nearly all the tertiary beds.

With respect to the divisions of the genus, we are not disposed to say much; only we think it will be desirable, in order to facilitate the discovery of species, to increase the number of divisions, particularly when it is remembered that there are perhaps 250 species: indeed it is almost impossible to ascertain many of the species enumerated by Lamarck, for want of some indication of his distribution of them: this however is not the only difficulty, for it may be further remarked that out of 80 species enumerated by Lamarck, there are references to figures of only 52; a fact which shows in a most convincing point of view the little attention that has hitherto been given to specific distinctions, and methodical distribution, as well as the necessity and use of coloured representations. In our plate we have represented one of each of Mr. Swainson's divisions, together with one of those that he has called *Conohelix*, and such others as appear to show the greatest variety of characters.—In our work on the Species of Shells, we intend to give coloured graphic illustrations of every species and remarkable variety, trusting that our friends who possess unique specimens will allow us the use of them for that purpose.



## PECTEN.



**TESTA** inæquivalvis. subæquilateralis, plerumque radiatim sulcata, valvis auritis, auriculis inæqualibus; sinu byssi in alterâ valvâ; *impressione musculari* magna sublaterali; *impressione musculari* pallii absque sinu; cardine lineari; ligamento tripartito, partibus duabus laterali-bus elongatis, lineam cardinalem, rectam, sequentibus, tertiâ parte triangulari, crassâ, in fossulâ internâ, centrali, cardinis positâ.



THE first observation that presents itself to our mind in commencing our account of this extensive and beautiful genus is the difficulty of deciding upon the propriety or impropriety of dividing it into several separate genera, or effecting nearly the same useful and necessary object, by grouping the species under several divisions of one genus; we have chosen the latter proceeding, because we think it easier for the learner, as directing his attention in the first place to the general characters of a large group, and then pointing out the peculiarities of the several smaller parcels which compose it, and thus leading by degrees to the specific characters of each individual.

The Pectines are all more or less inequivalve, even those that are nearly lenticular, having one valve rather smaller than the other: sometimes they are nearly equilateral, but generally they are inequilateral; for the most part they are covered with ribs, or grooves radiating from the umbones to the margins; on either side of the umbo in each valve may be always observed an irregularly triangular appendage, commonly called an ear; these ears are unequal in size: immediately below one of them in

## PECTEN.

the flatter valve is a small notch for the passage of a byssus: muscular impression large, placed rather on one side; muscular impression of the mantle without any sinus; hinge linear, ligament consisting of three portions, of which the two lateral are elongated and follow the hinge line, the remaining portion triangular, thick, placed in a central pit within the hinge.

We have stated above, that immediately below one ear of the flatter valve is a notch for the passage of the byssus; we mention this again because we believe that all the Pectinidæ are naturally attached by a byssus, although it is seldom observed, even in the living specimens; we account for this circumstance, however, by supposing that their attachment by the byssus is very slight; we have seen them attaching their threads by means of their small and slender foot. Many of the Pectines have a row of small sharp teeth on that side of the shell under the ear, which forms a part of the sinus for the byssus.

The numerous species of which this genus is composed may be divided nearly as follows:

1. Both valves convex, equal or nearly in size, an example of which is given in our plates.
2. One valve flat, the other deep or convex. For an example of this see *Pecten Jacobæus*.
3. Both valves rather convex, not meeting all round; example *P. Pleuronectes*.
4. Both valves convex, but unequal in size; examples *P. bifrons* and *aurantiacus*.
5. Irregular, apparently adherent by the outside, but only taking the form of whatever it is attached to in consequence of being close pressed to it. This has generally been thought to belong to the Spondylidæ, and has been named *Hinnites* by De France; we have, however, proved it to be a *Pecten*: see *Zool. Journal*. *Pecten Pusio* is an example of it.

In the singularity of their structure and in the beauty of their colouring the Pectines yield to none of the bivalves; among the handsomest and most remarkable, the following are deserving of particular notice, viz.

*P. bifrons*, for its brilliant purple colour within.

## PECTEN.

**P. Plica**, for the singular rugosity of the inside of the hinge line.

**P. nodosus**, for the richness of its colouring and its singular vaulted tubercles.

**P. Pallium**, or Ducal Mantle, for its brilliancy of colour, and squamose surface.

**P. histrionicus**, for its pretty Harlequin coat.

Many of the species are remarkable for the difference in colouring observable in the two valves. It is scarcely necessary to add that they are all marine.

There are many fossil species, which are found in most of the strata from the *Crag* down to the *Oolitic* series.

The *Pectines* were united with the *Ostreæ* by Linné, most authors have however agreed in separating them: they are easily distinguished by their not being attached by the outside of one valve.



## PLEUROTOMARIA.



**TESTA** turbinata, spiralis, aperturâ quadrato-subrotundâ; labio externo acuto, emarginatione profundâ supernè, prope suturam positâ.



Of the genera distinguished by a more or less deep fissure or notch in the upper part of the outer lip, the *Pleurotomaria* of De France (including, in our opinion, the *Scissurella* of D'Orbigny) has no canal, consequently it appears, as far as a judgment can be formed from the shell alone to belong to the family of the *Turbinidæ* or *Trochidæ*. This Genus, if we except some very minute recent species to which D'Orbigny has given the generic appellation of *Scissurella*, is only found in a fossil state. We are not aware of its general occurrence in other formations than the inferior Oolite, and the Kimmeridge Shale or Oxford Clay; two exceptions may however be mentioned, for casts are found in a Limestone bed in Norway, which is probably contemporaneous with the chalk, but whose characters are much disguised, and some minute species (*Scissurellæ*) are found in the *Calcaire grossier*. It appears to us indeed probable that it may be also found in other intermediate beds, though we are not aware of the circumstance.

We have not been able to ascertain whether this Genus should be arranged with the *Turbinidæ* or the *Trochidæ*, for the different species which may properly be called *Pleurotomaria* differ in form very much, some of them having the exact form of *Trochi* and others resembling *Turbines*. This can only be ascertained upon the discovery of the operculum, if indeed it possess any, which in the *Turbinidæ* is thick and testaceous, and in the *Trochidæ* thin and horny: though spiral in both. We can only further state with respect to its place in the system, that it appears to us to bear the same relation to *Trochus* or *Turbo*, that *Pleurotoma* does to *Fusus* or *Fasciolaria*.

## PLEUROTOMARIA.

Shell spiral, turbinated, sometimes quite conical, and having either a nearly square, or somewhat rounded aperture, generally however of a rounded squarish form: the outer lip being sharp edged; and having near its upper edge a deep notch or fissure near the suture. The extent of this notch is proportionally much greater than in *Pleurotoma*. There is no canal; and we feel it to be important to repeat this circumstance, because some who are but slightly acquainted with the Genus *Pleurotoma* might else have enquired, wherein it differed from that Genus, both having the notch in the side; although independently of this notch there is so much difference in general form.

## MYA.



TESTA transversa, utrinque hians, dente cardinali, in valvâ alterâ, unico, magno, compresso, dilatato; valvâ alterâ edentulâ; impressionibus muscularibus, duabus, lateralibus, distantibus, anticâ angustiore, posticâ suborbiculari. *Impressiones musculares pallii sinu magno. Ligamentum internum*, magnum, denti prominulo in valvâ alterâ et in alterâ foveæ affixum.



A GENUS of marine shells, of which very few species appear to exist, all belonging, as far as we know, to the northern hemisphere. Those species which are at present included in *Mya* form a very natural Genus, well characterized by the large and prominent spoon-shaped process to which the internal cartilage is affixed in one valve.

It will scarcely now be necessary to point out the impropriety of continuing to unite together the *Uniones*, the *Corbulæ*, the *Panopææ*, the *Anatinæ* and the *Glycimerides*, with our present Genus: the association is so evidently unnatural, that, having already pointed out the reasons for separating some of them, we shall here merely state that they are now all separated by common consent, although formerly confounded together in the Linnean *Mya*. True *Myæ* in a fossil state are, we believe, only found in the Crag and its contemporaneous formations, though we are aware that several have been described as fossil *Myæ* which belong to older beds; these indeed resemble them closely in external form, but can only be determined with precision by the characters of the inside.

The *Myæ* appear to be most nearly related to the *Anatinæ* and the *Corbulæ*, and may perhaps be connected with the *Solenaceæ* on one side, by the intervention of *Panopæa*, and with the *Macraceæ* on the other by means of *Lutraria*. The animal of the *Myæ* lives buried in the sand; its epidermis not only covers the shell, but also



## MYA.

projects far beyond it at the posterior extremity, covering the two long combined tubes which the animal projects through the sand, one for the passage of the water to the branchiæ, the other excretory.

We do not hesitate to unite Turton's Genus *Sphenia*, because it only differs a little in the size of the tooth in the sinistral valve, which is not so much dilated, nor so prominent as in the ordinary *Myæ*.

Shell transverse, nearly equivalve, gaping at both ends, but in a greater degree at the posterior end, with a single large, compressed, dilated, vertically projecting tooth in one valve; the other valve without any teeth. Muscular impressions two, lateral, distant; the anterior rather narrow, and the posterior nearly orbicular. Muscular impression of the mantle with a large sinus. Ligament internal, large, fixed to the prominent tooth in one valve, and to a large subumbonal cicatrix in the other.

## MYOCHAMA.



TESTA inæquivalvis, irregularis, adhærens; valvâ affixâ dentibus duobus marginalibus, divaricatis, ad umbonem disjunctis, foveolâ trigonâ intermediâ alteram testaceâ appendicis extremitatem, cartilagine corneâ connexam, excipiente; valvâ liberâ dentibus duobus inæqualibus, parvis, divaricatis, alterâ appendicis extremitate foveolæ intermediæ insertâ. Umbones valvæ liberæ internè, alterius externè, recurvi. *Impressiones musculares* duæ, orbiculares, distantes, laterales. *Impressio pallii* sinu brevi, lato. *Ligamentum* tenue, externum.



A NEW and very singular Genus of bivalve shells, lately discovered and first described by Mr. S. Stutchbury in the 5th vol. of the Zoological Journal, p. 96. It was found attached to a smooth species of *Pectunculus* and to *Trigonia pectinata* at Port Jackson, New South Wales; and it has been named *Myochama* from the circumstance of its connecting in itself some of the characters of the *Myariæ* and *Chamaceæ*. In general appearance *Myochama* bears so near a resemblance to *Anomia*, that if particular attention be not paid to its internal characters and the mode of its adherence, it might be easily mistaken for that Genus. The two distant lateral muscular impressions, and the absence of the shelly appendage by which *Anomia* is attached, easily distinguish it. We have said that *Myochama* combines in itself some of the characters of the *Myariæ* and the *Chamaceæ*; those which it has in common with the *Chamaceæ* are its muscular impressions, and its being attached by the outside of one valve; while it has in common with some of the *Myariæ* an internal shelly appendage in the hinge: from *Lamarck's* Genus *Anatina* it is distinguished by its being an irregular and adherent shell.

## MYOCHAMA.

Shell inequivalve, irregular, adhering by the external surface of one valve; this attached valve has two unequal diverging marginal teeth at the hinge, which are separated at the umbo by the triangular pit in which one end of the testaceous appendage above-mentioned is inserted, and connected by a horny cartilage: the free valve, which is larger than the other and very convex, has two small unequal, diverging teeth close under the umbo, in which by means of a cartilage is inserted the other end of the testaceous appendage. The umbo of the free valve is curved inwards, that of the attached valve outwards. There are two muscular impressions in each valve, which are nearly orbicular, distant and lateral. The muscular impression of the mantle has a short broad sinus.

Only one species of this remarkable Genus has yet been found, it has distinct radiating, and rather prominent dichotomous ribs or grooves passing from the beak towards the margins; these appear to be characteristic; but when attached to Trigonia these natural ribs are crossed by others, caused by the granose ribs of the Trigonia, their position and strength depending upon the situation it occupies. This species has been named *Myochama anomioïdes* by Mr. S. Stutchbury; it has a thin pellucid epidermis.

## CLEIDOTHÆRUS.\*



Stutchbury in Zoological Journal, Vol. V., p. 97. *Camostrée*, de Roissy.



**TESTA** inæquivalvis, adhærens ; dente cardinali conico, in valvâ liberâ, in fossulam alterius valvæ inserto ; appendice testaceâ, elongatâ, recurvâ, cartilagine convexâ, et in cicatricem profundam infra utrumque umbonem insertâ. *Impressiones musculares*, in utrâque valvâ duæ, laterales, antica prælonga, postica suborbicularis. *Impressio pallii* integra. *Ligamentum* internum.



At first sight this remarkable shell has generally been taken for a *Chama*,† which it resembles so exactly, that after having ourselves become acquainted with its prominent distinguishing character, we feel that we cannot sufficiently praise Mr. de Roissy, who has shown so high a degree of critical acumen as to have separated it from *Chama*, without knowing of the singular circumstance of its having an internal cardinal shelly appendage. This is another Genus which has been fully made known by Mr. S. Stutchbury, who received some specimens in their complete state from Port Jackson, in the commencement of 1830. He has named it *Cleidothærus*, from the remarkable circumstance of its internal hinge cartilage, having an

\* So named by Mr. S. Stutchbury “ from the *Clavicle* in the *hinge*.”

† Of course we mean here to speak of the *Lamarckian* Genus *Chama*: it is to be regretted, that however great the merit of that distinguished naturalist has been in distinguishing the real characters of shells, his system is not adopted so generally as it deserves to be.

## CLEIDOTHÆRUS.

elongated testaceous appendage, in form resembling the human clavicle; as far as this character goes, connecting the Chamaceæ with the Myariæ of Lamarck.

Shell bivalve, somewhat pearly, inequivalve, involute, attached by the outside of the larger valve. Hinge with a small conical pointed tooth in the free valve, fitting into a corresponding pit in the attached valve. A testaceous, rather elongated, curved appendage,\* connected by cartilage, is inserted into a deep cicatrix within each umbo. Muscular impressions two in each valve, lateral, the anterior ligulate, the posterior suborbicular. Muscular impression of the mantle entire. Ligament external.

The only species of this Genus at present known was found attached to sandstone rocks at the entrance to Port Jackson, by T. Young, Esq., R.N. Some imperfect specimens had been sent to England many years ago, probably from the same spot, by Mr. A. Humphrey. Some of these have a brownish red colour, whereas those of Mr. Young were of a dull livid colour. The imperfection of these specimens consisted in their having lost the internal appendage. All the specimens have adhered by the anterior side of the large and deeper valve.

\* Called by Mr. S. Stutchbury a "clavicle." We do not approve of this application of the term, because, though there is some analogy both in the form and use between this appendage and the human clavicle, they are not corresponding parts of the animal frame.

## CYPRINA.



Lam.



TESTA æquivalvis, inæquilateralis, obliquè cordata; umbonibus obliquè curvis; dentibus tribus in utrâque valvâ cardinalibus, basi approximatis, supernè subdivaricatis; dente laterali a cardine remoto, postico. *Impressiones musculares* in utrâque valvâ duæ, laterales, distantes. *Impressio* muscularis pallii integra. *Ligamentum* externum, partim in sinu marginali postico, immersum. Epidermis cornea, crassa, olivacea.



A GENUS of bivalves separated by Lamark from the Linnean *Venus*, and closely resembling many species of that genus in general appearance and form. Lamarck seems to think it scarcely sufficiently distinguished as a genus, we are of opinion, on the contrary, that its characters are well marked. Seven fossil species and one recent are described by him, but we possess three recent species. British Naturalists will be surprised when we assert, from an intimate acquaintance with the Linnean *Venus Islandica* from the coast of Iceland, that our common species generally known by that appellation is perfectly distinct, and must henceforward be distinguished by another name.

All the recent *Cyprinæ* belong to the Northern hemisphere, at least as far as we know, for we have never seen or heard of any having been brought from the Southern; they seem to be peculiar to the cold, icy climates of Newfoundland and Iceland: one species alone occurs on the coast of Britain and the other shores of northern

## CYPRINA.

Europe. The fossil species are only found in the tertiary bed, contemporaneous with the *London Clay* and *Calcaire grossier*.

Shell equivalve, inequilateral, obliquely cordate, umbones obliquely curved anteriorly, with three cardinal teeth in each valve, approximated at their bases, but somewhat diverging at their upper parts; and a posterior lateral tooth at a distance from the hinge teeth. Two lateral, distant muscular impressions in each valve.

Muscular impression of the mantle entire.

Ligament external, partly buried in a deep, marginal, posterior, dorsal sinus. Epidermis horny, thick, rough, and of a dark olive colour in full grown individuals, though in young specimens it is frequently very thin and pale.

In several characters the Cyprinæ approach Lamarck's *Conchæ fluviatiles*, a circumstance which he has observed, and it is remarkable that the two species peculiar to Iceland and Newfoundland are generally eroded at and near the umbones; it must however be stated that this peculiarity appears to be common to such shells as belong to very northern, frozen regions, and to such as are found in fresh water and at the mouths of rivers.



## SOLEN.



TESTA æquivalvis, elongata, subcylindrica, valdè inæquilateralis, utrâque extremitate hians, anticâ brevissimâ, truncatâ vel subtruncatâ, interdum rotundatâ. Cardo dentibus variis, plerumque acutis, recurvis; interdum dente laterali, elongato, uncinato. *Impressiones musculares* distantes, anticâ ligulatâ, sub vel post umbonem positâ, posticâ irregularis, subovalis; *impressio muscularis* pallii rectiuscula, longissima, posticè bifurcata.



IN endeavouring to draw up a definition of this Genus we have experienced much difficulty, on account of the very great diversity of character exhibited by the shells which have, by common consent, been hitherto united together as *Solenes*. In No. XXV. of this work under the article *Sanguinolaria* it will be seen that we have not hesitated to separate from it several which had hitherto been associated with it. We now think that all those whose anterior muscular impression is placed before the hinge teeth, might without impropriety be detached from it: some of these would go to increase the Genus *Psammobia*, others form DeBlainville's Genus *Solecurtus*, and those in which may be observed an incrassated internal rib passing from the umbones toward the inferior edge, may form a well marked and distinct Genus. Such a separation will much facilitate the task of the learner in arriving at a knowledge of the natural genera, and it will not be attended with any real inconvenience, because it is very evident that Lamarck's "*Solenacées*" must be brought close to his "*Nymphacées Solenaires*" in the natural system. Adopting this view of the subject, we include in the Genus *Solen* only those which are generally termed *Razor Shells*, whose anterior side is very short, and whose anterior muscular impression is placed immediately under or behind the beaks.

## SOLEN.

Another circumstance which induces us the more readily to adopt this view, is, that the teeth in these, which may be not improperly termed typical species, are so variable that no dependance can be placed on them for generic characters, almost every species being different. It is remarkable that typical species of this genus are found in all parts of the world, and that the resemblance between those which inhabit the shores of Europe, South America, and Australia, is so great that it is difficult to point out good distinguishing characters. Several species are common on the coasts of Britain, of these the *Siliqua* grows to the length of more than ten inches in the neighbourhood of Belfast. The animal is remarkable for an enormous muscular foot which probably aids it in burrowing in the sand, which it frequently does to the depth of two feet in a perpendicular direction, and it seems to take its station habitually near the upper extremity of its hole, and upon the slightest disturbance it retreats with amazing rapidity to the lower end.

Very rarely found in a fossil state in the *Calcaire grossier*, and in the London clay.

## CYTHEREA.



Lam.



**TESTA** bivalvis, æquivalvis, plerumque plus minusve inæquilateralis; vel obtusè trigona, vel ovalis, vel lenticularis; lævis vel concentricè, vel radiatim striata; *dentibus* utriusque valvæ *cardinalibus* tribus vel plurimis, divergentibus; *lateralis* unico, antico, plus minusve approximato.



THE Linnean Genus *Venus* consisted of an immense assemblage of shells remarkably different in their characters, and in the habits of the animals by which they have been formed. That the *Cytherea* should have been associated with the typical *Veneres* of Lamarck is not surprising, because their general appearance is much alike, but the decided separation of *Lucina*, *Corbis*, *Megadesma*,\* and *Cyrena* seems to be fully warranted by the great differences in their general characters. We apprehend that the time is not far distant when the establishment of several well-marked groups of smaller extent, will, under new generic appellations, be thought desirable. Taking *Cytherea lusoria* of Lamarck as typical, and associating with it such other species as accord well with that in general characters, we shall still find that several very different forms have been associated together, even in the Genus *Cytherea* as it stands in Lamarck. We feel obliged to state that, in our opinion the *Veneres* and *Cythereæ* require a most careful revision; and that all the species should be arranged

\* *Galathea*, Lam.

## CYTHEREA.

into groups according to their peculiarities, if we would arrive at any thing like precision in describing the characters by which each Genus is to be distinguished ; it would perhaps be found necessary to constitute and characterize several new genera ; but this, we think, would be a decided advantage to the science, particularly when the great number of species, and the great diversity of character among the species that are now arranged together under those two generic appellations are taken into the account. In order to convey a tolerably accurate notion of Cytherea as it now stands, we shall endeavour to point out the various types of form of which it is composed.

First, The typical species, *C. lusoria*, *petechialis*, and others, are smooth on the outside, and covered with a thin horny epidermis ; there are three diverging hinge teeth in each valve, and a lateral anterior tooth under the lunule, which is elongated, and but indistinctly marked : there is also a small rounded sinus in the muscular impression of the mantle. Their general form is obtusely triangular, the anterior side being rather shorter, and the beak distinctly inclining forwards.

The second group of which Cytherea consists, and of which we believe *C. Corbis*, Lam., is one, has four or five diverging hinge teeth ; a more lengthened, almost lamellar anterior lateral tooth ; a larger rounded sinus in the muscular impression of the mantle ; a lengthened and still indistinctly marked lunule, a smooth outside, and, in such species as we have been able to examine, a thin velvety epidermis. These are more distinctly triangular, and the beak less inclined forwards.

A third group, consisting of *C. Chione*, *Erycina*, and others, which are of a nearly regular oval form, having the anterior side much shorter than the posterior : they are smooth on the outside, have a thin horny epidermis, and some of them are longitudinally grooved : they have three diverging cardinal teeth in each valve, and a closely approximated, short, blunt lateral tooth. The sinus in the muscular impression of the mantle is very large, and generally pointed at its anterior end.

The fourth group are nearly lenticular in general form and concentrically grooved on the outside ; the sinus in the muscular impression of the mantle is large, oblique, and straight sided ; there are three hinge teeth in each

## CYTHEREA.

valve, and the lateral tooth is generally very small, and closely approximated.

One other important group remains to be distinguished; which leads directly to the typical group of Lamarckian *Veneres*, and apparently differing from them only in having a distinct blunt lateral tooth, and in having no sinus to the muscular impression of the mantle. Those Lamarckian Cythereæ which have the muscular impression of the mantle thus entire, are mostly smooth on the outside; some of them, however, are concentrically striated, and others have diverging striæ and ribs; their umbones are mostly inclined forwards. In these the lunule is more distinctly marked than in most others. *C. pectinata*, *gibbia*, *castrensis*, *scripta*, *ornata*, and other well-known species belong to this group.

Other groups, distinguished by less prominent characters, and of smaller extent, occur; one of these it may be proper to particularize; it consists of only three or four species, which have been retained among the *Donaces* by Lamarck, namely, *C. meroe* and its cognate species; these are remarkable for their nearly regular oblong form, their central umbones, and a deep sulcus formed between the valves immediately behind the umbones: they have scarcely any circumstance in common with the *Donaces*.

We have drawn up the following character of this Genus in such a manner as to admit all the groups mentioned above; much greater precision would of course be necessary, were it thought prudent to establish so many different genera.

Shell bivalve, equivalve, generally more or less inequilateral, obtusely triangular, ovate or lenticular, smooth or variously striated; with three or more diverging hinge teeth, and one anterior lateral tooth in each valve; the lateral tooth more or less approximated to the hinge teeth.

*Cytherea* is nearly related to *Venus* and *Cyprina*, differing however from both in having a lateral tooth; it appears to pass into *Venus* by those species which are nearly lenticular in form, and whose lateral tooth is brought very close to the hinge teeth, for we find in some of Lamarck's typical *Veneres* a small vestige of an approximated lateral tooth. The form of the muscular impressions will distinguish the Cythereæ from the *Lucinæ*.

The fossil species of this extensive Genus belong princi-

## CYTHEREA.

pally to the tertiary formations, being not unfrequent in the Calcaire grossier and the London Clay; they occur also in the green sand, and in some of the secondary beds. Many of the recent species are very beautiful, and naturally highly polished, and some are remarkable for pointed spinous processes on the outside (e. g. *C. Dione*, Lam., *Venus Dione*, Linn.) They are found in the seas of all countries, but particularly in the East and West Indies: in Japan the valves of *C. lusoria* are gaily painted and gilt on the inside, and they are then used for games of chance or skill, as our playing cards.

## ANATINA.



TESTA transversa, libera, inæquilateralis, plerumque inæquivalvis; utroque latere hiantes: plerumque processu parvo, cochleariformi, ligamentifero in utrâque valvâ et appendice testaceâ, curvâ, parvâ, interdum minimâ, ante processus ligamento connexâ.



APPARENTLY related to *Mya* in the habits of the animal, as well as in the general characters of the shell, but well distinguished from it, by its having a moveable testaceous appendage connected with the ligament immediately before the hinge teeth. It is observable that Lamarck, who established the Genus, should not have mentioned this singular appendage, of course founding its claim to generic distinction upon the difference of form and position of the ligamentiferous processes; this little appendage is, however, in some species so small, and in general so deciduous, that it is not surprizing Lamarck should not have noticed it—the specimens which he had the opportunity of examining having probably lost it. We must not here omit to notice that Lamarck's *Amphidesma corbuloïdes* belongs to this Genus: it is the *Mya norvegica* of authors, and the *Lyonsia striata* of Turton.

There are so many differences in the characters peculiar to each species, which may, without impropriety be united under the generic appellation of *Anatina* of Lamarck, that it is difficult to find any set of characters in which they generically agree; in some species the valves are both equal, in others they are unequal; in some there is a distinct spoon-shaped process to which the ligament is attached, in others this process is much less evident, while there are several in which it does not exist at all; in some the accessory, internal, testaceous, appendage (the



## ANATINA.

presence of which, in a free bivalve, constitutes the essential character of the genus) is very small and of a curved semilunar shape; in others it is proportionately large, though of the same shape; sometimes again it is flat and placed without the intervention of any cardinal processes against the internal ligament. Notwithstanding this remarkable diversity, we cannot consent to separate any of these from the rest, because we are convinced, that if any separation were allowed, it would be necessary to raise nearly every known species to the rank of a genus. Wherefore, as far as regards those bivalves which have an internal testaceous appendage, we are satisfied with separating from Anatina only the *Myochama* and the *Cleidothærus*, both of which differ from it in being *fixed*.

The *Anatinæ* may therefore be described as free, transverse, inequilateral bivalves, generally with unequal valves; sometimes gaping, sometimes nearly closed at both ends, generally having a small spoon-shaped internal process, to which the ligament is attached, in each valve; in connection with which there is a small, variously shaped, testaceous, internal appendage also attached to the ligament, and apparently serving to strengthen the connection between the two valves.

Fossil in the tertiary beds only. All the species are marine.

## NAUTILUS.



TESTA univalvis, libera, suborbicularis, conca-  
merata, convoluta, anfractibus contiguus, septis  
transversis, extus concavis, siphunculo per-  
forato, marginibus integris; aperturâ amplis-  
simâ.



ALTHOUGH, by common consent, this has been called *Nautilus*, even among scientific authors, it is not the *Nautilus* of Pliny\*, nor does it seem to be better entitled to the appellation, notwithstanding its cephalopodous animal probably possesses the power of raising it to the surface and swimming about thereon while living, and notwithstanding it appears that the shell, when the animal is dead, must necessarily swim, in consequence of its peculiar construction, rendering it specifically lighter than the water, until the chambers becoming filled with water after all traces of the animal are gone, it would as surely sink to the bottom. Our reason for supposing it undeserving of the name it bears, is that it could not swim in such a position as would make it bear any resemblance to a sailing vessel, and it is not probable that its animal, which is carnivorous, and whose prey must be constantly in the water, should have either the means or the disposition to place its shell in such a position: and even if we were to suppose that the animal had such means, which is indeed most

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\* The commonly received fictions (first broached by Pliny) which have sometimes been so elegantly embodied, do not belong to this, but are intended to apply to the *Argonauta* or *Paper Sailor*.

## NAUTILUS.

improbable, because it would require the exertion of such a kind of instinct and muscular action as must be entirely useless to it, it would certainly be very little, if at all disposed, to leave the pursuit of its prey in order to take a pleasant sail on the surface of the ocean. What we have here stated is on the supposition that its animal is cephalopodous, (and we think there is much reason for adopting that opinion), and it is well known that the cephalopoda are exceedingly voracious; we cannot therefore suppose that its time would be otherwise occupied than in pursuing the bent of its natural dispositions. If any of our readers, desirous of ascertaining the probability of this animal sailing about on the surface of the ocean, will place one of the shells in a vessel of water sufficiently deep, it will be found to swim exactly in the position in which we have drawn it in our plate, in which position if the animal were in it and partly surrounding it, as it most probably does, its head and body would be entirely covered by the water, and no part of the edge of the shell could be visible; thus supposing the shell to resemble a boat or sailing vessel, it could naturally only swim with its stern upwards; and to keep its gunnel above water it would require ballast, and the nicest possible balancing: in fact it appears to us that neither the Nautilus nor the Argonaut could possibly swim about with their shells so placed as to resemble a galley or skiff.

Of recent Nautili three or four species at most are known, which we believe to be all inhabitants of the Pacific and Australian, possibly extending also to the Indian ocean. The fossil species, which are more numerous, are found not only in the tertiary beds, as the London clay and the Calcaire grossier, but also in several of the beds belonging to the secondary class, particularly among the Oolites, and as low as the Mountain Limestone.

Shell univalve, not attached, suborbicular, convolute, with contiguous volutions, in which respect it differs essentially from Spirula, whose volutions are separated; chambers numerous, the septa transverse, concave outwardly, perforated by a siphunculus, and having their margins entire: aperture very large. Lamarck says in

## NAUTILUS.

his character of this Genus, that the last volution covers the former ones; but it may be observed that this is really the case in one species alone, the *Nautilus Pompilius*, whereas in the *N. umbilicatus* and *N. scrobiculatus*, the former volutions are partly exposed: this should not therefore enter into the generic character.

We find it impossible by words to convey a description of the form of this remarkable shell, we are, however the less solicitous about it, as our account of it is accompanied by a representation which will convey to those who are not yet acquainted with it a perfect idea of its form and general appearance.

Lamarck states,\* that the *Nautilus Pompilius* is found in a fossil state at Courtagnon, Grignon, Chaumont, in the environs of Dax, &c. and adds, "C'est véritablement la même espèce que celle qui vit actuellement dans les mers des Indes." This assertion is not true, at least with reference to the species found at Dax; the conclusion he draws from it, supposing it to be a fact, is therefore untenable.

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\* Hist. Nat. des Anim. sans vert. VII. 634.

it may be observed that this is really  
the same as the relative frequency  
of the word "and" in the  
language of the world in general.

It is not a question of the  
frequency of the word "and" in the  
language of the world in general,  
but of the frequency of the word  
"and" in the language of the world  
in general.

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in general.

## ARGONAUTA.



**TESTA** univalvis, libera, tenuissima, subnaviculiformi, subspirali, spirâ involutâ, aperturâ maximâ, lanceolatâ, dorso bicarinato, carinis tuberculiferis.

Animal heteropodum?



CELEBRATED in poetic fiction as is the *Nautilus*, or *Paper Sailor*, (which by common consent is now termed *Argonauta*,) the shell, itself eminently beautiful, surpasses whatever may be said of it, for it conveys no false impression to the mind, and to the true Philosopher, like all the works of Nature, it is a subject of delightful contemplation, as proclaiming the wisdom and power of its great Creator.

The animal which forms this transcendently elegant shell is not yet known to Naturalists; that it belongs to the Cephalopoda is scarcely probable, since it is well known that none of that family, not even excepting the *Ocythoë* (which has by some been regarded as its proper inhabitant and not as a parasite,) has the means of producing an wholly external calcareous secretion. That the *Ocythoë* is merely a parasite taking up its abode and depositing its eggs in the Argonaut, after perhaps devouring its rightful owner, cannot in our opinion, be doubtful.

But we think the proper inhabitant of the *Argonaut*, if ever it should be known, will prove to be nearly of the same nature with that to which the *Carinaria* belongs: or it might possibly belong to Lamarck's family of *Pteropoda*. It is a singular fact that its haunts should never have been discovered, while its shell is so frequently found in possession of its great enemy the *Ocythoë*, and particularly so, since where it does live it must abound even much

## ARGONAUTA.

more than the *Ocythoë* itself. We think, moreover, that our opinion respecting the nature of the animal belonging to this Genus obtains some support from a passage in a paper "On the animal of *Argonauta*," by Mr. Broderip, in the *Zoological Journal*, vol. IV., p. 65, which we take the liberty of transcribing. "I have sometimes thought I could observe traces of muscular impression in the inside of the involuted termination of the chamber of the shell, such, for instance, as might be caused by the insertion of parts similar to those inserted in the shell of *Carinaria*." And in confirmation of the opinion advanced above that the *Ocythoë*, so usually found in the shell of the Argonaut, does not really belong to it, I am happy to be permitted, by Mr. Broderip, to state that he is more and more fully convinced that it is only a parasite, and that he has not arrived at this conviction without the most mature consideration of all the facts that have come to his knowledge. We sincerely wish that those who have opportunities would use every endeavour, by deep sea trawling in those situations where the Argonauts with the *Ocythoë* abound, to discover the real animal of which the Argonaut constitutes an essential part, most probably for the defence of important viscera.

The Argonaut is only known in a recent state, although several fossil Ammonites approach so nearly to it in general form, that some inexperienced Geologists have taken them for Argonauts: there are several very distinct species of the Genus, and of the Argo several remarkable varieties, which have by some been regarded as distinct species.

In general form the Argonaut, when placed in a certain position, having its aperture nearly horizontal, may be compared to a little ship; it consists of a single valve, which is never attached, and very thin and generally ribbed or tubercular all over; it is somewhat spiral, the spiral part being involute; the aperture is very large and lanceolate in form: the back or keel part is formed of two rows of sharpish tubercles, between which there is a narrow flat space.



## CLITIA.



Leach.



TESTA compresso-subconicâ, basi affixâ; valvis quatuor, inæqualibus, duabus majoribus, duabus minoribus, lateraliter intertextis compositâ; aperturâ trapeziformi, operculo bipartito clausâ. Valvis operculi, alterâ irregulariter tetragonâ, alterâ subtrigonâ.

DISTINCT from *Creusia*, although the external shell in both consists of four pieces. In this the four pieces are irregularly unequal, and the operculum, moreover, consists of only two pieces which are also unequal.

This is the *Lepas striata* of Pennant, *L. Verruca* of Gmel., and it not unaptly resembles a small *warty* excrescence adhering to the outside of other shells, &c. Two recent species only have occurred, one of which is common on our own coasts, the other has only lately been brought from the coast of South America adhering to *Mytilus magellanicus*, and to other shells.

Shell of a very flattened conical form, irregular, adhering by the base, composed of four unequal valves, two larger and two smaller, laterally joined together by the interlocking of their dentated edges; none of these valves are exactly alike; the aperture is rather laterally placed, trapeziform, and entirely closed by a bipartite operculum, one of whose pieces is irregularly quadrate, and the other nearly triangular.

Of the two species we have selected for our illustration that which has not yet been described, it differs from the common European species, of which we have also given a magnified representation, in the outside of the valves being smooth, whereas in *Cl. Verruca* they are striated: we call it *Cl. lævigata*: the two species may be distinguished by the following diagnosis.

1. *Cl. Verruca*, testâ valvis externè rugosis.

Syn. *Lepas Verruca*, Gmel. et nonnull.

*Lepas striata*, Penn. et nonnull.

*Balanus intertextus*, Pult.

*Creusia*, Lam.

Obs. Evidently placed by Lamarck as a species of *Creusia*.

2. *Cl. lævigata*, testâ valvis externè lævigatis.

11111

RECEIVED  
JAN 11 1961  
U.S. DEPARTMENT OF AGRICULTURE  
WASHINGTON, D.C.

1. The following information was received from the  
U.S. Department of Agriculture, Washington, D.C.  
on January 11, 1961, regarding the above  
mentioned subject.

## CARDIUM.



Linn.



TESTA æquivalvis, subæquilateralis, interdum posticè hians, costis ab umbone divergentibus ut plurimum ornata; margine internâ dentatâ seu crenulatâ: dentibus cardinalibus in utrâque valvâ duobus, approximatis, obliquis, cruciatim insertis; lateralibus duobus: remotis, *impressionibus muscularibus* duabus, lateralibus, distantibus; *impressionibus muscularibus* pallii integris. *Ligamentum* externum.



THE Linnean Genus *Cardium* is so natural an assemblage of related species, that it remains nearly, if not altogether in the same state as it was left by that great naturalist; neither *Bruguère* nor *Lamarck* having thought it desirable to separate any of the species as forming a distinct genus. We have thought one or two fossil species which *Lamarck* had united to *Cardium*, more properly associated with *Hippopus*, our reasons for which we have already explained in our account of the latter Genus. We are the more surprized at this Genus having always remained entire, because the species thus combined vary in general form as much, if not more, than those of any other Linnean Genus, some being nearly globular, others compressed and longitudinal, others much shorter from front to back than they are deep or wide: we beg, however, in saying thus much, to express our entire approbation of this alliance, which appears to us, as far as the shells alone

## CARDIUM.

are concerned, to be perfectly natural; and we have no doubt, that if the animals of all these species were known, they would be found fully to evidence the propriety of it.\*

That a Genus of so great importance should be passed over with so few observations may perhaps appear strange, but it really presents itself to our view with so few encumbrances, that we have nothing more to say or do than to describe the characters peculiar to the Genus and give a somewhat detailed view of the principal external forms included in it, and, stating some particulars relating to the characters and habits of its animal, conclude with such information as we have relating to its fossil species.

The species of the Genus *Cardium* must be described as equivalve, although there is always a slight difference in the form of the two valves: they are nearly equilateral, and more or less gaping posteriorly: the outer surface of some few of the species is smooth and shining, but for the most part they have more or less strongly marked ribs, radiating from the umbones to the margins: inner margins, except close to the hinge surrounded by larger or small teeth or crenulations according to the size of the radiating ribs, those species which have no ribs, having nevertheless very fine teeth round the inner margin. Cardinal teeth in each valve two, placed very near together, oblique, and locking into each other cross-wise: there are also two remote, lateral, teeth in each valve:† muscular impressions two in each valve, lateral, distant: muscular impression of the mantle entire. Ligament external.

We have stated that the *Cardia* vary much in general form; thus, some species are nearly *globular*, such for instance as the *C. tuberculare*; some are deeper than they are long or wide, such as *C. biradiatum*: some are longer from front to back than in any other direction, one of these has been called *C. soleniforme*; others have a prominent nearly central ridge commencing at the umbones

\* It will be observed by some that we here write upon purely conchological principles. *Cardium* must be regarded as a natural Genus, even by those who cannot consent to the formation of a natural system, founded upon the combined consideration of the animal inhabitants in connexion with the shells, which we are nevertheless persuaded can alone be the foundation of the natural system.

† One species is remarkable for being almost destitute of teeth, it is the *Cardium edentulum*, Lam.

## CARDIUM.

and passing to the ventral margin, some of these are much shorter from front to back, and much wider from side to side than in other directions; the *C. Cardissa* is a remarkable example of this form. The form of *C. hibernicum*\* is very remarkable, its anterior extremity being very wide and obtuse, and its posterior end being narrow and produced into the form of a lengthened beak-like process.

Little is known at present of the natural affinities of the Genus *Cardium*; *Trigonia*, and *Isocardia* appear to be most nearly related to it: a strong muscular foot, which enables them to move with considerable rapidity seems to be one of the most prominent characters: in the *Trigonia* this is so strong, that some specimens of the *T. pectinata* which Mr. S. Stutchbury laid upon the seat of a boat preparatory to putting them in spirits, leaped over the gunwale and rejoined their old companions.

The fossil species of *Cardium* occur in nearly all the fossiliferous beds from the Mountain Limestone upwards. In the Mountain Limestone occurred the *C. hibernicum*, of which we have already mentioned some peculiarities. But the fossil species are much more numerous in the newer formations, as in the green sand, London clay and crag in England, and in their contemporaneous beds in other countries.

\* We are informed by the Rev. J. Bulwer that the fossil which has hitherto been called *Cardium hibernicum* has no claim to a place in this Genus.

THE  
END

## AMMONITES.



*Ammonites* and *Orbulites*, Lam. Anim. sans vert.

*Ammonoceras*, ejusd.



TESTA discoidea, convoluta, polythalamia, anfractibus contiguis, marginibus septorum lobatis et sinuosis, siphone dorsali.



AMONG the various fossil shells which abound in the secondary beds, and which are not known in a recent state, one of the most remarkable and numerous is the Genus *Ammonites*, commonly called *Cornu Ammonis* from its resemblance to the convoluted horn generally represented on the head of Jupiter Ammon in Mythological History. *Snake-stone* is also a name that is topically applied to these fossils, and their resemblance to a coiled snake is surreptitiously aided by an artificially formed head. This Genus, which consists of discoid, convoluted, chambered shells with contiguous volutions, the margins of whose septa are lobated and sinuous, and whose siphunculus is dorsal, is very nearly related to *Nautilus*, differing from it principally in the position of the siphunculus, and in the circumstance of the lobated and sinuous edges of the Septa. We unite Lamarck's *Orbulites* and his *Ammonoceras* with *Ammonites*, because we cannot discover any sufficient distinguishing character. The circumstance in which they differ, and which has caused Lamarck to separate them, is, that in the *Orbulites* the last volutions covers all the former, while in *Ammonites* all the volutions are apparent; this, however, is not a sufficient character, because there are connecting species, and if it were admitted, it would be necessary to separate the only three known recent species of *Nautilus* into two genera: the existence of an umbilicus can never be regarded as a generic distinction, inasmuch as in some instances it is



## AMMONITES.

not even specific. *Ammonoceras* is only an accidentally worn portion of an *Ammonite*. Nothing can of course be known concerning the animal which forms the Ammonite, nor of its habits; it appears to us a singular circumstance that so many species should abound in all the secondary and in some of the tertiary beds, and yet that no recent species should be known. Lamarck supposes it probable that they may live in the great depths of the sea, and we are much inclined to adopt such a supposition (and to hope that the discovery of recent species will soon reward the exertions of some enterprising Naturalists,) because we are at a loss to imagine the possibility of their being entirely lost. We know, concerning the *Terebratula*, the only other Genus which abounds in all the secondary beds, and which is there associated with the *Ammonites*, that some of its species are found as abundantly in a living as in a fossil state: and we know no reason that the *Ammonites* should not be found, since recent *Terebratulæ* and *Trigoniæ* which a few years ago were known only in a fossil state, are now to be seen in many collections.

We have represented three specimens, one to show an *Ammonites*, another an *Orbulites* according to Lamarck, and the third to show the sinuous and lobated edges of the septa.

## BACULITES.



**TESTA** recta, gradatim crescens, concamerata, marginibus septorum lobatis, sinuosissimis, siphone dorsali: ultimo articulo elongato.



A GENUS which is only known in a fossil state, it was first discovered by Faujas de St. Fond in the Limestone of Maestricht, where, however, it does not appear to be so abundant as in a similar Limestone in the neighbourhood of Valognes, in Normandy, from which latter place we have occasionally received some very fine specimens by the favour of our kind friend C. D. DeGerville. This Limestone appears to be of a peculiar sort, characterized by the *Baculites* and *Hamites* contained in it; all its fossils are casts, and if we were permitted to form our judgment of its age from these casts, we should say it appears to us to be nearly contemporaneous with the *Calcaire grossier*, for it contains casts of several of the shells that are most characteristic of that bed.

This is a very remarkable Genus, nearly related to *Ammonites*, and differing from it in being straight; it bears the same relation to *Orthoceratites* that *Ammonites* does to *Nautilus*, having its chambers lobated and very sinuous at their edges. Being only known in a fossil state, we are not of course at all acquainted with its animal, yet we venture to give an opinion that it must have been almost, if not entirely an internal shell. It is probable that there are many species of this Genus, but as we only know the casts of the insides, we cannot indicate the specific

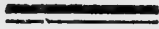
## BACULITES.

differences, which consist, most probably, in the external characters. It should appear, from the circumstance of their increasing in thickness so very gradually, that they may attain to a considerable length; the most complete we have seen have been about ten inches long: and the last chamber is generally several inches in length. Faujas and Lamarck appear to have confounded the *Hamites* with the *Baculites*.

## HAMITES.



TESTA cylindrica, vel subcylindrica, elongata, attenuata, hamiformis, concamerata, marginibus septorum sinuosis, siphone dorsali.



ANOTHER remarkable Genus of shells belonging as is supposed to the cephalopodous Mollusca, and related in some respects to *Ammonites*. It was proposed by Parkinson to include some singular polythalamous fossils found in the Chalk Marle, near Folkstone, but it has since become more important, by the addition of some larger species from other localities and various beds. The fine specimen we have represented is from the Baculite Limestone at Fresville in the vicinity of Valognes, in Normandy. The Hamites differ from the Ammonites in not forming a spiral discoid, and from Baculite in being bent, and forming two nearly parallel limbs, not quite contiguous to each other. Our account of this Genus must necessarily be incomplete, for neither of the terminations have ever been seen: as far as we know it may be distinguished as a cylindrical or nearly cylindrical shell, which is elongated, attenuated, and bent into the form of a hook, (whence its name,) its chambers are numerous, and the margins of the dissepiments sinuous, its siphunculus is dorsal.

The Hamites occur in the Chalk Marle, and in the Chalk, particularly in Kent and Sussex.

THEORY OF THE  
RELATIONSHIP BETWEEN  
THE STATE AND THE  
ECONOMY

The theory of the relationship between the state and the economy is a complex one, involving a number of different factors. It is a theory that has been developed over a long period of time, and it is one that is still being developed today. The theory is based on the idea that the state has a role to play in the economy, and that this role is determined by a number of factors, including the nature of the economy, the needs of the population, and the interests of the state. The theory is also based on the idea that the state has a responsibility to ensure that the economy is functioning in a way that is consistent with the interests of the population. This responsibility is often referred to as the 'welfare state'.

It is important to note that the theory of the relationship between the state and the economy is not a static one. It is a theory that is constantly evolving, and it is one that is being challenged by a number of different factors. One of the main challenges to the theory is the fact that the economy is becoming increasingly globalized, and this is leading to a number of different problems, including the loss of jobs and the increasing inequality of income. Another challenge to the theory is the fact that the state is becoming increasingly decentralized, and this is leading to a number of different problems, including the loss of power and the increasing fragmentation of the state.

## SCHAPHITES.



**TESTA** concamerata, involuta, anfractibus primis minoribus, ultimo dilatato et elongato, demùm attenuato et inflexo, septis lobatis et sinuosis.



A FOSSIL Genus established by Parkinson and related to *Ammonites*, but differing much in its general form in consequence of the remarkable extension and inflexion of its last chamber. It is found, but rarely, in three contiguous beds, the Chalk, Chalk marl and green Sand: in Sussex, Wiltshire and near Rouen in Normandy.

Shell chambered, involute, its first volutions small and increasing very gradually; its last elongated and dilated or expanded, and then diminishing and turned inwardly; the divisions of the chambers lobed and sinuous. It is probably in a great measure, if not wholly internal; of course nothing is known of its animal, though it is supposed to be cephalopodous.

the first condition,  $\text{div}(C) = 0$ , is necessary for  $\text{div}(C) = 0$  to hold. The second condition is satisfied in the case of a constant vector field  $C$  and a constant function  $\phi$ . The third condition is satisfied in the case of a constant vector field  $C$  and a constant function  $\phi$ .

[illegible]



## PSAMMOBIA.



Lam.



TESTA transversa, oblonga, ad utramque extremitatem paululùm hians: dentibus duobus cardinalibus in valvâ alterâ, unico in alterâ. *Ligamentum* externum. *Impressiones musculares* in utrâque valvâ duæ, suborbiculares, distantes; *impressio pallii* sinu maximo. Epi-dermis tenuis, cornea.



A GENUS established by Lamarck, consisting of a combination of several species taken from the Linnean Tellinæ and Solenes; but to which we think it necessary to add one or two cognate species from the Linnean Veneres and the whole of the Lamarckian Genus *Psammotæa*, respecting which he makes use of the remarkable expression that the species of which it consists are only “*degenerated Psammobia*.” Indeed we do not hesitate to assert that the smaller number of hinge teeth, which forms the principal distinguishing character of *Psammotæa* according to him, is a quite accidental circumstance, arising from some of the teeth having been broken away: for when the hinge teeth are perfect, there are as many as in *Psammobia*. It may now seem desirable to ascertain how far it might be proper to unite De Blainville’s Genus *Solenicurtus* (which ought to be *Solenicurtus*) with *Psammobia*. Upon this subject we may observe that we think this Genus established upon as good a foundation as any of the usually received genera: the principal differences are as follows, in *Solenicurtus* both ends of the shell are usually rounded, whereas in *Psammobia* one end is generally more or less angular;

## PSAMMOBIA.

in *Solenicurtus* the teeth are *two* in each valve, and they are for the most part lengthened and curved, while in *Psammobia* they are short and mostly bifid: the muscular impression of the mantle also in *Solenicurtus* has a much larger sinus than in *Psammobia*.

*Psammobia* appears to be nearly related to *Sanguinolaria*, indeed we are of opinion, as we have before stated, that several of Lamarck's *Sanguinolariæ* should be arranged with the *Psammobiæ*, particularly his *S. rugosa*, and *S. occidentis*.

Shell oblong, somewhat gaping at each extremity, with two cardinal teeth in one valve, and one in the other. Ligament external. Muscular impressions two, suborbicular, distant, one placed near each end of the shell: muscular impression of the mantle with a very large sinus. Epidermis thin, horny.

Many recent species of this pretty Genus are well known, and some are common on our own shores, of these the *Ps. ferroensis* is remarkable, inasmuch as it has an approximation to the flexuous fold characteristic of *Tellina*, it is the *Tellina ferroensis* of Linnean authors. Several fossil species are also known, which are mostly confined to the tertiary beds; and the green sand contains at least one.

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\* By an inadvertance in the descriptions of *Tellina* and *Tellinides* in No. XXXI, we have reversed the anterior and posterior ends of the shell. We must therefore request our readers to correct our expressions, and for posterior to read anterior and *vice versa*.

## SCISSURELLA.

—◆—◆—◆—  
D'Orbigny.  
—◆—◆—◆—

**TESTA** univalvis, libera, umbilicata, spirâ depressâ, aperturâ subrotundâ, labiis disjunctis, canali nullo, peristomate acuto; foramine oblongo prope marginem dextram incrementum anfractuum sequente et carinam in dorso testæ efformante.



I HAVE already, in the Zoological Journal, vol. I. p. 255, explained my reasons for regarding this genus as distinct from *Pleurotomaria* of De France.

First discovered by M. Alcide Dessalines D'Orbigny, in prosecuting his researches among the marine and fossil sands of various countries, in order to study the microscopic Cephalopoda which are found in them. I apprehend that all the specimens which may have come under the observation of M. D'Orbigny, must have been more or less imperfect or very young shells, for he describes the upper part of the right lip as "notched, with a deep slit," whereas, in several which I have selected from the fossil sand of Grignon, the margin of the right lip is entire, and an oblong foramen reaches very nearly to the edge, but not quite; at the same time in a recent specimen, which is much smaller, the margin is notched with a deep slit as D'Orbigny describes it. Whether, however, the real character of the genus consist in a deep notch in the upper edge of the right lip, or an oblong foramen reaching nearly to the edge, we think it properly arranged near to *Fissurella* or *Haliotis*, because its affinity appears to be nearer to those genera than to the *Trochidæ*.

Shell univalve, free, with an umbilicus and a depressed spire; aperture nearly round; the lips separated from

## SCISSURELLA.

each other at the upper part on the left side ; peristome sharp-edged ; an oblong foramen near the upper part of the right lip, following the growth of the volutions and placed nearly parallel with the suture, and forming a sort of keel upon the back of the shell ; no canal.

Four species are described by D'Orbigny, two of which are recent from the coast of the Mediterranean, and two found in fossil sand from Castel-Arquato ; we have met with several specimens in the Calcaire grossier of Grignon, and the Rev. Dr. Fleming has described a recent species under the appellation of *Sc. crispa*, which he found in shell sand from Noss, Zetland, after a storm.

## SCALPELLUM.



**TESTA** tredecim-valvi, lateraliter compressâ, pedunculo brevi squamoso affixâ, valvis contiguis, inæqualibus, utroque latere basalibus tribus minoribus, superioribus duabus supernè acuminatis, intermediâ unicâ trapeziformi, dorsali elongatâ, apice acuminato, dorso angulato.



*SCALPELLUM* is another genus of *Cirripedes* which Dr. Leach has separated, and we think rightly, from Lamarck's *Anatifa* (now called *Pentelasmis* under circumstances which we have formerly explained.) At present we are only acquainted with two species belonging to this genus, both of which are recent, one of them not uncommonly found adhering to *Sertularia antennina* on the coasts of Britain and the other from the straits of Magellan.

In form *Scalpellum* approaches to *Pentelasmis*, being laterally compressed and acuminate at the upper extremity; it consists of thirteen valves, six on each side and one dorsal; it is affixed by a short squamose peduncle. The valves are contiguous, united together by a sort of cartilage, they are unequal, the three basal (on each side) being smaller than the rest, the two upper being acuminate at their upper extremity and the single central one trapeziform. The dorsal valve is elongated, acuminate at the apex and angular on the back.

It may not be improper here to draw the attention of our readers to the subject of the true nature of the *Cirripedes* in general. It will be observed that they are entitled to a place in this work because by common consent they have been considered as *Shells*; and in speaking of *Pentelasmis* we have shown that according to Lamarck, they partook of the characters both of the *Mollusca* and the

## SCALPELLUM.

*Crustacea.* Mr. Thompson in his Zoological Researches, announces the discovery that they are truly *Crustacea*. Without describing the facts or entering upon the arguments with which he supports this opinion, we must be permitted to say, that we do not think that he has fully demonstrated it; at the same time, considering that as far as we hitherto knew, the Cirripedes were all attached, the circumstance of their being free when very young, accounts well to our mind for the fact of each species being found attached to peculiar situations, which would only be compatible with the notion of their being at one time free agents, and possessed of an instinctive volition determining their choice of situation.

## PLEUROBRANCHUS.



*Cuvier.*



**TESTA** interna, dorsalis, haliotoidea, tenuis, supernè convexiuscula, vertice laterali, subterminali, inflexo.



FIRST noticed and described under the denomination of *Bulla Plumula*,\* by Montagu, who has described the animal as well as the shells, although our continental neighbours have not chosen to give him the credit of having first made known this very remarkable animal. The name applied to the animal by Cuvier, refers to the position of the *Branchiæ*, which form a sort of feather-like appendage attached to its *right side*. It is observable that this name has no reference to the shell, a circumstance which would be much to be regretted, but that the shell is so slender and thin that it is scarcely likely to be met with separate from the animal. The general form of the shell is very much like that of an *Haliotis*, it is very thin, and is placed on the back of the animal, being entirely internal and hidden by the integuments: it is rather convex on the outer or upper side, with a lateral, nearly terminal, inflected vertex.

Few species of this Genus are known as yet, though it is probable that there are many; two, at least, are natives of our own coasts, and several others are known as inhabitants of the coasts of the Red Sea; they have lately been described by Rüppell. There are no fossils which can be referred with certainty to this Genus.

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\* See Mont. Test. Brit. 2nd Vignette f. . 1803. For another species which Montagu has called *Lamellaria membranacea*, see Linn. Trans.





## CYCLOSTOMA.



TESTA turbinata, spirâ plerumque obtusâ, anfractibus rotundatis; aperturâ ferè circulari, peritremate supernè plus minusve angulato, nonnunquam incrassato et reflexo. Operculo spirali.



THIS Genus when first established by Lamarck, consisted, like some of the old Linnean genera, of an assemblage of land, freshwater and marine shells, differing among one another most materially in respect to their essential characters. My readers, who have not attended to the progress of knowledge relating to the Mollusca, will be surprized at being informed, that, taking the form of the aperture alone into consideration, Lamarck at first united together in his Genus Cyclostoma, shells, which he afterwards saw the necessity of separating from it, under the names of *Scalaria*, *Delphinula*, *Paludina*, and *Valvata*; genera, all agreeing very nearly together in the form of the aperture, though differing essentially, not only in the characters and habits of their animal inhabitants, but also in the structure and peculiarities of the shells themselves. Hence we infer the impossibility of attaining anything approaching to a natural *Conchological* System, for if an arrangement of shells be made from the consideration of their apparent resemblance to each other, it will be found that the consideration of their animals will prove such arrangement of the shells to be far from natural; the affinities of the animals will not at all accord with those of the shells alone. We will, however, endeavour to demonstrate, as nearly as possible, the impropriety of the particular combination above-mentioned, and also to describe the peculiarities of each of the genera that have been thus combined, and to show their relations.

The present Genus differs from *Scalaria*, inasmuch as there is never more than one period of growth, conse-

## CYCLOSTOMA.

quently the lip is thickened when full grown only, and there are none of those varices ornamenting the outer surface, which add so much to the beauty of the *Scalaria*.\* The *Delphinulæ* (which are nearly related to *Trochus* and *Turbo*) are of a very different texture, being perlaceous within, they are moreover of a comparatively thick substance and the lip is not reflected when full grown. The *Paludinæ* and *Valvatæ* which are related to *Ampullaria*, approach more nearly to *Cyclostoma* than the *Scalaria* or the *Delphinulæ* do, though independently of the great difference in the form of their opercula and their apertures; these also may be known from the greater number of *Cyclostomata* by their not having a reflected lip when full grown.

The *Cyclostomata* have been very properly separated from the Linnean Genus *Turbo*, and the Genus as thus established has been adopted by Lamarck and subsequent authors; I have included in it all *land* shells having the following characters. Shell turbinated, thin, mostly with an obtuse apex to the spire, and with rounded whorls: aperture nearly circular, peritreme more or less angular at the upper part, sometimes a little thickened, generally reflected and fringed externally. Operculum horny, inclining to testaceous in some species, spiral.

All the *Cyclostomata* are land-shells, and most of them are tropical; one or two only are found in Britain, and very few others are Europæan. The animal of one species alone, the *C. elegans*, is known in this country, it is ably described by the Rev. M. J. Berkeley, in the *Zoological Journal*, vol. IV. p. 278, to which I refer. The Genus appears to be very nearly related to *Helicina*, though differing materially in the form of the aperture and in the operculum. One species, namely, the *C. Turbo*, approaches so nearly in form to the *Helicina*, that, not having seen its operculum, I cannot be quite sure that I have placed it properly in *Cyclostoma*.

The shells of this Genus mostly belong to the southern hemisphere, over which the various species are spread in every direction: the Europæan species are very few and small, while several fine species are found in the East

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\* The *Scalariæ* approach very nearly to the *Turritellæ*.

## CYCLOSTOMA.

and West Indies, and in the Islands of the South Seas; and though we have received a great assemblage of various shells from North America, we have not a single Cyclostoma among them. Of fossil species there are very few; the *C. Mumia*, which occurs in some of the upper tertiary beds in the vicinity of Paris, is the only decided fossil species we are acquainted with; for though Lamarck mentions seven or eight fossil species, it is more than probable that most of them are Valvatæ.

Lamarck has described twenty-six recent species, which are probably true Cyclostomata, for his *C. Mumia* is, as he afterwards states, is only found in a fossil state, and his *C. truncatulum*, which he has adopted from Draparnaud, is not a Cyclostoma. I am acquainted with more than eighty species, but there are several of Lamarck's which I cannot recognize, namely, *C. ambiguum*, *C. decussatum*, *C. lineolatum*, *C. mammillare*, *C. orbella*, and *C. multilabre*. I have represented several species showing as great diversity of form as I know to exist among the shells composing the Genus. One of these is nearly discoid, and shaped very much like a *Planorbis*, another is nearly cylindrical, one has an undulated fringed margin to the aperture, and another has no reflected margin.



## SPIRULA.



**TESTA** univalvis, libera, concamerata, convoluta, anfractibus paucis, disjunctis; septis siphunculo perforato, marginibus integris.

**Animal** Cephalopodum.



**DISTINGUISHED** from *Nautilus* by the separation of the volutions, and from *Ammonites* by their chambers not being sinuated at the edge. This is a remarkable and elegant little shell, whose animal is undoubtedly a Cephalopod in a great measure covering the shell. It has been described and figured by Peron and Lesueur in the *Voyage de Découvertes aux terres Australes*, vol. I. p. 45, pl. XXX. f. 4. a. 4. b.

Shell univalve, free, internal, (partly seen through the posterior extremity of the animal,) convoluted, chambered; volutions few in number, separated; the septum or wall dividing each chamber perforated by a little siphon or tube, which passes through the chambers without opening into them; margins of the septa entire.

Only one species of this Genus is at present known, which is recent, and inhabits the Atlantic and Indian Oceans. Its animal appears to be pelagic, and when dead, the shells are found in abundance floating on the surface of the water. They are also frequently thrown on the shore.





## CARINARIA.



*Lam.*



**TESTA** univalvis, tenuissima, hyalina, conica, vertice reflexo, in spiram convoluto; lateribus compressis; dorso unicarinato, aperturâ oblongâ, integrâ, latere dorsali acuminato.  
Animal heteropodum.



THE *Glass Nautilus* or *Carinaria* has been long remarked as one of the most singular and beautiful of shells. In our opinion it must be regarded as very nearly related to the Argonaut. So thin and fragile a shell seems scarcely fitted for the place which it occupies about the animal, namely, that of covering and protecting the important viscera, and were it not for our knowledge of the fact that it is external, we should be disposed to think it required a thick and strong covering for its protection against the turbulence of the waves, did we not believe that He who formed it hath made "nought in vain, or not for admirable ends," and fashioned even this frail vessel with the structure most appropriate to its destined purposes.

The animal, of which this elegant shell forms an essential part, is itself very remarkable, and may be regarded as characteristic of a peculiar family; for representations as well as for a particular description of it by M. Verany of Nice, we refer to the *Zoological Journal*, vol. V. p. 325.

## CARINARIA.

There are two species of this remarkable Genus, one of which has very rarely been brought from Amboyna, the other is not uncommon in the Mediterranean.

Shell univalve, nearly equilateral, very thin, transparent as glass, and extremely fragile, conical, with a reflected, convoluted vertex, sides compressed, back with a single keel: aperture oblong, entire, its dorsal end acuminate.

We have given two views of *Carinaria Mediterranea*.

## ELMINIUS.



*Leach, in Zool. Journ.*



TESTA subconica, valvis quatuor, solidis, inæqualibus, lateraliter ferruminatis, composita; aperturâ apicali magnâ; basi affixâ: (*valvâ testaceâ basali nullâ.*) Operculum bipartitum, valvis quatuor compositum, pari antico subhorizontali.



A GENUS of sessile Cirripedes proposed by Dr. Leach in the Zoological Journal. Like *Conia* the parietal portion consists of only four pieces, the structure of these valves is, however, very different, as in *Conia* they are thick and porous, but in *Elminius* they are thin and solid; it is moreover distinguishable in a remarkable manner from *Conia* by its having no testaceous basal valve.

Shell somewhat conical, composed of four thin, solid, unequal, laterally soldered valves, affixed by the base, without the intervention of a testaceous basal valve, and having a large opening at the apex. It appears, like most of the Cirripedes, to be gregarious, and when affixed in numbers, side by side, they lose their conical form and become more or less regularly cylindrical. The Genus is remarkable for the wideness of the aperture, and for the size of the operculum, which is bipartite and consists of four pieces, the anterior pair of which are placed in a very horizontal position.

We have received a few specimens of this hitherto unknown Genus, from the coast of South America; some are attached to a *Mytilus* and others to a worn pebble: Capt. King has named the species *Elminius Leachii*, see *Zool. Journ.* vol. V. p. 334.

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## HELICINA.



*Lam.*



**TESTA** subglobosa, heliciformis, imperforata; aperturâ subtrigonâ, peritremate subincrassato, reflexo; columellâ incrassatâ, transversâ, supra umbilicum expansâ, basi inferiore angulum cum labio externo efformante. Operculum plerumque testaceum, trigonum, haud spirale, nucleo laterali.



A PRETTY little Genus of land shells, apparently belonging exclusively to tropical climates: of which we now know about 30 species\*. When first proposed by Lamarck he united the beautiful little marine shells, which he has since with great propriety separated, under the name of Rotella. In general appearance the Helicinæ very much resemble small Helices, from which, however, they may be distinguished by their having an operculum, as well as by the thickened substance of the shell in the place of the umbilicus. They are nearly related to Cyclostoma, but differ from that Genus in the circumstance of their apertures not being at all circular and in their operculum not being spiral. We observe that Lamarck has placed them at a distance from Cyclostoma, probably from his not having been acquainted with the animal, which very closely resembles that of the last mentioned

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\* Mr. Gray described all the species that were then known, amounting to seventeen in the first volume of the Zoological Journal.

## HELICINA.

Genus, the principal differences being in the general form of the shells, in that of the apertures and in the operculum.

The Helicinæ are generally nearly globular, sometimes, however, the spire is depressed and they have a somewhat lenticular form, when very young they have an umbilicus, of which, however, they do not retain the slightest appearance when full grown; their aperture is rather triangular, the peritreme being somewhat thickened and reflected: the columella also is thickened, nearly transverse, spread over that part which is usually occupied by the umbilicus, its lower edge forming an angle with the outer lip. Operculum generally testaceous, rather triangular, not spiral, with a lateral nucleus.

Only known in a recent state; the West India Islands furnish by far the greater number of species hitherto known; a few have been brought from the Islands in the South Seas, and one is known as an inhabitant of North America, namely the *H. orbiculata*.\* One species which has not yet been described, named by us *carinata*, appears to abound in one of the Sandwich Islands, where the natives formerly made various ornaments by stringing them together.

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\* Named by Say, *Olygyra orbiculata*.

## GNATHODON.



Gray in American Journal of Science.



**TESTA** subovalis, crassa, æquivalvis, inæquilateralis, epidermide olivaceâ induta; umbonibus distantibus; dentibus, alterius valvæ, cardinali unico, acuminato, lateralibus duobus, postico elongato, antico uncinato; alterius, cardinalibus duobus, acuminatis, lateralibus duobus, postico elongato, antico cuneiformi; *impressionibus muscularibus* duabus, lateralibus; *impressione musculari pallii* sinu parvo. *Ligamentum* internum.



A VERY singular Genus of Bivalves, lately received from New Orleans; as the shell was sent unaccompanied with any particular information, we cannot tell whether it be a marine or fresh-water production; though judging from the circumstance of the umbones being eroded, we think it fresh-water. It is remarkable for having the general external aspect of a *Cyrena*, in conjunction with the internal ligament characteristic of a *Crassatella*.

Shell nearly oval, thick, equivalve, inequilateral, covered with an olivaceous epidermis; umbones distant; in one valve there is an acuminate cardinal tooth and two lateral teeth, the posterior of which is elongated, the anterior uncinat; in the other valve there are also two acuminate cardinal and two lateral teeth, the posterior of which is elongated and the anterior wedge-shaped.



## GNATHODON.

Muscular impressions two, lateral; muscular impression of the mantle with a small sinus; ligament internal, in a deep pit, proceeding from the umbo.

Distinguished from *Cyrena*, which it most nearly resembles, by its having an internal ligament, and from *Crassatella*, by its olivaceous epidermis, and its eroded umbones. *Gnathodon* appears to us to connect the family of the *Macraceæ* with the genera *Cyrena* and *Cyclas*. In its teeth it differs materially from all others, they have, however, one circumstance in common with several *Cyrenæ* and with some *Macraceæ*, namely, that of the lateral elongated teeth being crenated. All the specimens we have seen are beautifully white within.

Our plate represents *Gnathodon cuneatus*.

## SPIRIFER.



**TESTA** transversa, æquilateralis, inæquivalvis, cardine lineari, recto, ad utrumque umbonum latus extenso; umbonibus plus minusve distantibus, areâ planulatâ intermediâ, (*aperturâ trigonâ centrali, byssum transmittente,*) appendiculis duabus internis, spiraliter convolutis.



ANOTHER Genus of Bivalve shells known only in a fossil state which is peculiar to the oldest beds, and principally characteristic of the *Mountain* or *Carboniferous Limestone*, the *Transition Limestone* and the *old red Sandstone*; we believe not occurring in any bed above the *Magnesian Limestone*. It appears to be nearly related to *Terebratula*, from which, however, it is easily distinguished, externally by the area between the umbones, and internally by its spiral appendages. These appendages, which are commonly called *cartilages* are attached to and form a part of the smaller valve, they are not, however, cartilaginous, but consist of the same substance as the shell; in *Terebratula* they are never spiral.

Shell transverse, equilateral, inequivalve, with a linear straight hinge, extending equally on both sides of the umbones, which are more or less distant, being separated by an intermediate, flat area; which varies much in breadth according to the species. This area consists of three triangular parts, two of which are lateral, (one on each side) and the third which is central appears to

## SPIRIFER.

have been an opening for the passage of a byssus, by which probably the animal affixed itself to rocks, stones, &c. when living. Two spiral appendages are attached near the umbo within the smaller valve, whose convolutions diminish as they approach the smaller points of the shell, (one on each side) most distant from the umbones.

There are many species, which abound in the Mountain Limestone and which are mostly covered externally with striæ, ribs or grooves, radiating from the umbones to the ventral margins.

## DICERAS.



*Lam.*



**TESTA** inæquilateralis, inæquivalvis, umbone alterius valvæ affixa, dente magno, crasso, concavo, subauriculari, in valvâ majore prominente; *impressionibus muscularibus* in utrâque valvâ, duabus, lateralibus, distantibus: umbonibus magnis, divaricatis, spiraliter contortis.



WE have already shewn that this Genus is nearly related to Chama, and we have advanced an opinion that it may be regarded as forming a link connecting Isocardia with Chama. Lamarck has associated it in the same family as the last named Genus and observes that it differs so much in its hinge and in its singular umbones that it appeared to him to constitute a distinct Genus. We have never seen the hinge, so that it is not possible for us to form our judgment definitively; seeing, however, that the general form of the shell, connected with the circumstance of its being adhering by the point of the umbo of one valve, renders it very peculiar we have thought it desirable to give a representation of it. It appears to us probable that it is only adherent, as Lamarck observes "in the manner of the Gryphææ," that is when in its young state, for it is found to have been adherent by a small part of the point of one of its umbones. Bruguière did not think it sufficiently different to separate it from the true Chamæ.

Shell inequilateral, inequivalve, one valve larger than the other; attached by the point of the umbo of

## DICERAS.

the larger valve; “ *one very large, thick, concave, somewhat ear-shaped tooth is prominent in the larger valve;*” there are two lateral, distant, muscular impressions in each valve, and the umbones are large, very prominent, divaricated and rather irregularly spirally twisted, having a good deal of the appearance of a pair of horns; the generic name of *Diceras* has reference to this character of the umbones resembling two horns, while that of *arietinum*, by which Lamarck has designated the only species known to him, refers to the peculiar twisted character of rams horns by which the contorted umbones are characterized.

Only known in a fossil state, and found near Geneva and in Normandy: the casts are in granular Limestone, and the remains of the shell, when they occur, consist of crystallized Calcareous spar.

## ARCA.



TESTA æquivalvis vel subæquivalvis, inæquilateralis, trapeziformis, plus minusve ventricosa; *umbonibus* plus minusve distantibus *areâ* ligamenti separatis; *cardine* lineari, recto, dentibus minimis, plurimis instructo; *impressionibus muscularibus* duabus, lateralibus, distantibus. *Ligamentum* externum.



It is incumbent on us, in treating of this Genus, to remove erroneous impressions which may have been adopted in consequence of what we have advanced under the article Cucullæa. We have there asserted that the Cucullææ differ from the Arcæ in two circumstances, namely the inequality of the valves and the want of a byssus; and we have advanced a doubt as to the propriety of arranging the Cucullææ with the Arcaceæ. That we should now entertain a different opinion must not be regarded as surprising, since we have had many opportunities of obtaining information which we did not then possess, and we have become acquainted with many species of the existence of which we did not then know. The inequality of the valves is indeed mentioned by Lamarck as characteristic of some species of Arca, and we now know several species in which that peculiarity is remarkable; with respect to a byssus, there is no doubt that the Arca Noæ and some others are naturally affixed by a very strong tendinous substance in the same manner as the Mytili are affixed by their byssus, but we have great reason for doubting the existence of such an appendage in many other species, for in A. Noæ and such other species as we

## ARCA.

know to be affixed there is an open space in the ventral part of the valves (when closed) through which such byssus passes, while in the inequivalve *Arcæ*, and in some others there is no such open space any more than there is in *Cucullæa*. Moreover Lamarck informs us that some of the *Arcæ* live in the sand in the same manner as the *Cardia*, so that it appears to us that the *Arcaceæ*, including *Cucullæa* are on one side related to *Mytilus* and on the other to *Cardium*: and it might not be improper to divide the *Arcæ* into two or more genera, according as they are either affixed or free, equivalve or inequivalve; nevertheless as there is a peculiarity in which they all agree, namely, the straight hinge line with numerous small teeth, we prefer for the present to keep them altogether.

In general form the *Arcæ* for the most part, when placed with the ventral part downwards, may be not unaptly compared to a little ship, whence their name; the area of the ligament forming the deck; they are equivalve or nearly so; generally inequilateral, and mostly angular at both dorsal ends, though there are some species which are rounded; and they are more or less ventricose, some being remarkably so: the umbones are generally distant, being separated by the area to which the *external* ligament is attached and which it generally nearly covers: hinge linear, straight, furnished with numerous very small teeth on both sides. Muscular impressions two, lateral, distant.

The *Arcæ* abound on the coasts of nearly all countries, and apparently in all climates; several species are found on our own coast. In a fossil state they are numerous in the tertiary beds, and particular species are found even as low as the Inferior Oolite.

In our plate are represented, Fig. 1. The *Arca Noæ*, one of those species which are attached by a strong tendinous byssus: Fig. 2. *Arca rhombea*, and Fig. 3. *Arca inæquivalvis*.



## TRIDACNA.



*Lam.*, Hist. Nat. des Anim. sans vert.



**TESTA** æquivalvis, regularis, inæquilateralis, lunulâ hiantē, margine ventrali sinuoso; cardo alterius valvæ, dentibus duobus posticis, quorum alter brevis, alter elongatus; alterius, tribus, quorum unus brevis, duo elongati. *Ligamentum* submarginale, sub-externum, fulcro intra-marginali. Animal bysso tendineo rupibus affixum.



Few genera are so perfectly distinct as the present; separated from all others by characters peculiar to itself, it can scarcely even be said to be nearly related to any, if indeed we except Hippopus, to which in general form and in its remarkably sinuated edge it is closely allied. This, together with Hippopus, Cardita, Chama and others of very different characters are associated by Linneans under the generic appellation of Chama, than which association nothing can be less natural.

One species of this beautiful Genus is remarkable for the enormous magnitude to which it attains, the *T. Gigas*; it is the most gigantic of all shells; we refer to Dillwyn for an account of a pair of the valves of this species, which are used as "*Benitiérs*" in the church of St. Sulpice, at Paris, weighing more than 500 pounds, and Lamarck speaks of even larger.

Shell equivalve, regular, inequilateral, generally longitudinal, with a wide opening placed immediately anterior to the umbones, for the passage of a strong tendinous

## TRIDACNA.

byssus by which the animal fixes itself to the rocks. The posterior dorsal margin is nearly straight, and the ligament which is elongated, is affixed to its fulcrum just within the margin, so that it is not wholly external, though it is partly on the outside. The teeth, in one valve, are two, one of which is short and placed close to the umbo, the other elongated and near the margin; in the other valve, three, one of them short, and placed near the umbo, the others more lengthened and posterior. The whole of the ventral margin is deeply sinuated. The muscular impression may be traced, a little way within, around the whole margin, and it is more expanded toward the center of the ventral margin. The shells of this Genus are almost always of one colour, most commonly white, sometimes yellow, very seldom orange or rose coloured, but without variegation; their external surface is covered with broad radiating ribs, which are frequently crossed transversely by broad and high vaulted scales, giving the shells a very handsome appearance.

This Genus is only found recent and in tropical climates; we believe the East Indian and Australian Seas alone supply specimens of it. It differs from Hippopus in having a large opening placed just before the umbones. With *Chama*, Lam. it cannot be confounded, for that is an *irregular* shell *affixed* by the *outside* of one valve.

We have represented *Tridacna elongata*, Lam.

## GALEOMMA.

—◆◆—  
*Turton.*  
—◆◆—

**TESTA** tenuis, plerumque ovalis, æquivalvis, æquilateralis, margine ventrali hiantē; dente cardinali in utrâque valvâ unico; *impressionibus muscularibus* duabus, subapproximatis, *impressione musculari* pallii interruptâ, sinu nullo; *ligamento* parvo, duplice, parte internâ denti cardinali propinquâ, parte externâ fulcro prominenti affixo.



FIRST discovered by Dr. Turton and described by him in the Zoological Journal. A figure is there given from the only specimen that had then occurred; several have, however, been found since, and we possess four or five species from various localities.

Shell thin, generally of an oval shape, equivalve, and equilateral, with the ventral margin widely gaping: there is a single small cardinal tooth in each valve: the muscular impressions are two, they are lateral, though somewhat approximated: the muscular impression of the mantle is interrupted, but there is no sinus: ligament small, double, one part internal, close to the cardinal tooth, the other part external and fixed to a rather prominent fulcrum.

The animal has been found alive; we have, however, so little acquaintance with it that we do not venture to suggest anything about its affinities; we are informed, however, when living it is affixed to stones with the valves spread widely open.

Mr. Gray has obligingly favoured us with the following descriptive observations on this shell and its ani-

## GALEOMMA.

mal, which he has been enabled to make from specimens collected on the coast of Sicily.

“ The mantle of the animal is flat and stretched across the gape of the ventral edge of the shell, where it is furnished with a fringe that is attached to the epidermis of the shell, as in *Gastrochæna*, it has, however, only a short linear contracted opening at the posterior part of the gape: the foot is squarish, compressed, its base linear, truncated, of the size of the groove in the mantle. The structure of the mantle and foot of this animal is most like that of *Gastrochæna*, but it differs from that animal in not being provided with an elongated siphon, and the shell which approximates somewhat in form to some of the most gaping *Gastrochænæ* is at once distinguished from that genus by the umbones being more central, by the interior being destitute of any siphonal impression and by its having an internal cartilage. The shell is covered with a thin membranaceous epidermis which is easily rubbed off when fresh, and thus the shell is left white, semitransparent and marked with very fine slightly raised radiating striæ, the umbones are semiglobose, smooth, with a distinct circumscribed edge, the ligament is external, linear, expanded over the outer surface of the rather narrow cardinal facets, with the cartilage placed in a small, short triangular pit immediately under and slightly prominent beneath the umbones; the impressions of the adductor muscles are roundish and distinct, the front one has a smaller muscular impression above it, and there are two indistinct impressions extending nearly all along the arch of the cardinal edge.”

Fig. 1. 2. 3. *Galeomma Turtoni*.  
4. 5. ———— *Mauritianum*.

## TROCHUS.



TESTA conica, spirâ plus minusve elatâ, peripheriâ plerumque angulatâ, interdum rotundatâ; aperturâ plus minusve transversim depressâ, subtrapeziformi; columellâ arcuatâ, basi plus minusve prominulâ; operculo corneo, circulari, spirali, anfractibus plurimis, confertis.



So little attention having been formerly given to natural affinities, it is not surprising that in consequence of a certain accordance in general form, Linné and subsequent authors should have combined together shells of very various and distinct characters, while they separated others naturally allied to each other. Though this observation is more particularly applicable to Linné and his disciples, it must also be acknowledged that later authors, whose general endeavours have been successfully directed to the improvement of natural science, have to a certain degree fallen into the same error; thus Lamarck, attending too much to external form has united in *Trochus* shells which are not related to each other: for though in the character he gives of the Genus, and indeed of the family, he mentions an operculum as essential, he has united to it several, e. g. (his *T. radians*, *Pileus* and *T. Calytræformis*) which have no operculum; we observe also that several others, which are admitted by Lamarck, differ from the greater part of his *Trochi* in having a thick shelly operculum, while several whose operculum is like that of *Trochus Niloticus* and which should consequently be united to the *Trochi*, are found among the *Turbines*; whereas the only certain character by which the *Trochi* can be separated from the *Turbines* consists in the former having a horny, the latter a shelly operculum. That the

## TROCHUS.

general form of the shell cannot be regarded as its most important character, is evidenced by the fact that scarcely two species have the same precise form, though for the most part those which have a horny operculum with numerous closely set volutions, such as *Trochus Niloticus* and *Turbo Pica*, have a nearly similar general form, although they are found to differ much in their peculiarities: we have shown under *Turbo* that the Genus *Monodonta* of Lamarck as well as *Margarita* of Leach must for the most part be united to *Trochus*. We think, however, that *Rotella* and *Solarium* have been properly separated from *Trochus*.

The Trochi are conical with a more or less elevated spire, the axis of which being but slightly inclined and the edge of the base of the cone being in general angular, though it is sometimes rounded, they stand almost entirely upon the base, which as Lamarck truly says is generally flattish or even concave, as in *Trochus Niloticus* and *concausus*, though sometimes convex, as in *Trochus Pica*, (*Turbo Pica* auctorum.) Their aperture is more or less transversely depressed, (in the same degree as the base is flat, concave or convex) in general rather quadrate or trapeziform, and the dissimilarity in the form of the aperture and the operculum is remarkable, the latter being nearly circular. The edge of the aperture is oblique to the direction of the last volution of the shell and shows distinctly the inferior part of the columella, which is constantly more or less arched; in some species the base of the columella is truncated,\* and forms a more or less distinct tooth, (some of these form part of Lamarck's *Monodonta*;) in others it is continuous with the peritreme and has not the least vestige of a tubercular tooth; there is, however, a regular gradation from the one to the other. Operculum horny, circular, spiral, with numerous, close-set volutions, and having the spiral line external.

The Trochi are marine, and they are found almost everywhere, many are common on our own coasts, several of which are very beautiful, such as the *Tr. Magus*, *Tr. cinerarius*, *Tr. ziziphinus* and others. Some of the larger

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\* It is observable that although Lamarck gives this as the principal distinguishing character of *Monodonta*, the same character is to be remarked in many of his Trochi.

## TROCHUS.

species that belong to tropical climates are remarkably handsome and brilliant shells when carefully cleaned, but they have all naturally a horny epidermis which hides much of their beauty.

The fossil species, which are rather numerous, belong to the newer formations, such as the Crag, the Calcaire grossier, and the green sand; they are also found in the London clay: we have reason to believe that some species occur as low down the series of formations as the Lias.

Some species of Lamarckian Carocollæ have been placed with the Trochi by Linneans (e. g. the *Trochus terrestris* of some authors) these are, however, land shells and have no operculum; we have already stated the characters by which the Pyramidellæ may be easily distinguished from Trochus; but it may be necessary here to state, that the shell, called *Trochus telescopium* by Linneaus is more properly placed by Lamarck with his *Cerithia* to which it is closely allied.

Fig. 1. *Trochus Granatum*.

- |    |   |     |                                |
|----|---|-----|--------------------------------|
| 2. | } | ——— |                                |
| 3. |   |     |                                |
| 4. |   | ——— | nov. spec.                     |
| 5. |   | ——— | Labeo, <i>Monodonta</i> , Lam. |
| 6. |   | ——— | nov. spec.                     |
| 7. |   |     | Operculum of Tr. Pica.         |





## TURBO.



**TESTA** turbinata, spiralis, solidiuscula, spirâ plerumque mediocri, nonnunquam brevissimâ; aperturâ ferè circulari, peritremate acutiusculo, basi subeffuso; operculo extus testaceo, solido, intus corneo, spirali.



THE Genus *Turbo* in the acceptation of Linneans is indeed a mass of confusion, which has been but slightly reformed by modern writers; the separation of the genera *Turritella*, *Scaloria* and *Cyclostoma* cannot but be approved, and *Clausilia* ought never to have formed a part of it, because it does not at all accord with the Linnean definition of the Genus. The four above named genera being cleared off, we still find in the Lamarckian Genus *Turbo* a combination of shells of very various character; we think indeed that the four Lamarckian genera *Trochus*, *Turbo*, *Monodonta* and *Delphinula* require a careful revision, and we are further of opinion that the confusion at present existing in these genera has principally been caused by too great a dependance having been placed on the external form as a generic character. We shall endeavour to effect such a reformation as appears to us desirable in these four genera, by omitting entirely Lamarck's *Monodonta* and adopting the following as the distinguishing characters of the other three; and by the further separation of a rather numerous family under the already adopted name of *Littorina*. We would then, in the first place, separate all those shells hitherto spread into *Trochus*, *Turbo* and *Monodonta*, which have a solid testaceous operculum, whatever may be their external form, under the appellation of *Turbo*. Our Genus *Trochus* would consist of such other shells separated from the above named Lamarckian genera as are distinguished by a spiral horny operculum, with numerous closely

## TURBO.

set volutions, some of which have their columella plain, without any tooth near the base; these are the Lamarckian *Trochi*: others have a more or less distinct tooth near the base of the columella, these are Lamarck's *Monodonta*.\* *Delphinula* appears to us to be distinguished by its circular aperture and its thickened and reflected peritreme. The operculum of *Littorina* is spiral, its volutions are, however, very few and increase very rapidly in width, its columella is moreover in general somewhat depressed.

It is perhaps incumbent on us to notice two endeavours to clear up these genera in part, by separating some shells from them under the names of *Margarita* and *Marmarostoma*, the first of these has been given to some small thin shells whose operculum is horny, and spiral with numerous closely-set volutions, and belongs to our *Trochi*; the latter has been given by Swainson to a typical species of *Turbo*. The *Turbines* vary much in general form, some being conical, with a very flat base, and keeled edge, and others having a very regular top-shape. They are in general thick, with a spire of moderate length, though sometimes very short; their aperture is for the most part nearly circular, though sometimes rather transverse and somewhat trapezoidal; their peritreme rather sharp and not reflected, somewhat spreading at the lower part; operculum shelly, solid, externally very various in its appearance, but internally covered with a spiral horny plate; we think it the more necessary to mention this latter circumstance as many have mistaken the rounded external surface of these opercula for the part which is attached to the animal and *vice versâ*. It is observable that

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\* We have been under the necessity of entirely omitting Lamarck's *Monodonta*, because upon careful examination we find it merges into *Trochus*; the operculum is exactly similar in both, and it is observable, that Lamarck has separated them in the most arbitrary manner, without appearing to have been himself aware of any definite character by which they might be distinguished; thus we find him at one time uniting the Linnean *Trochus Pharaonis* to his *Monodonta* and afterwards restoring it to *Trochus*; this it is well known has a very distinct tooth near the base of the columella and should therefore have formed a part of his *Monodonta*; and so for the same reason, should *Trochus niloticus* and his *Turbo Pica*. We regard the whole of these as legitimate *Trochi*, inasmuch as the operculum in all is precisely similar and quite different from that of *Turbo*. Some of Lamarck's *Monodonta* belong to *Littorina*, and one of them is a land shell, probably related to *Auricula*.

## TURBO.

Lamarck does not once mention this thick testaceous operculum, although it is characteristic of his first thirteen species of *Turbo* as well as of some others: it is also peculiar to some of Lamarck's *Trochi*, which we consequently withdraw from *Trochus* and unite to *Turbo*. Another circumstance relating to the operculum is also worthy of notice, it is that the spiral line of the thick shelly operculum of *Turbo* is on the side by which it is fixed to the foot of the animal, whereas that of the thin horny operculum of *Trochus* is external. The outer surface of these shelly opercula is very differently constructed in the various species, and would be quite sufficient as a character by which the species might be distinguished.

The Turbines are marine, and for the most part belong to tropical climates, one species alone abounding on the shores of the Mediterranean. We have not any one on our own coasts. They are mostly handsome shells, and when deprived of the outer coat and polished the pearly substance of which they are formed is particularly brilliant. The *Turbo marmoratus* is remarkably splendid.

Few indeed are the known fossil species of this Genus, and such as we are acquainted with belong to the formations of the latest period: we have one from Sicily very similar to the *Turbo rugosus*; another from New South Wales nearly approaching in its characters to *T. torquatus* and we have some fossil opercula from the vale of Ronca.

- Fig. 1. *Turbo brevispinosus*, with its operculum.  
 2. 3. 4. and 5. Various opercula.  
 6. *Turbo setosus*.  
 7. ——— n. sp. from Valparaiso.  
 8. ——— *coronatus* var.  
 9. ——— n. sp. whose locality is unknown to us.



## LITTORINA.



*Fer.*



**TESTA** turbinata, spiralis, solidiuscula, nonnunquam tenuior; spirâ gradatim acuminatâ, nonnunquam brevissimâ; aperturâ ellipticâ, supernè acutiusculâ; peritremate acuto; columellâ planiusculâ; operculo corneo, spirali, anfractibus paucis, rapidè majoribus, nucleo laterali.

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THE shells which have lately been combined together under the generic appellation of *Littorina* have been hitherto arranged with the *Turbines* by Linneans and with *Turbo* and *Phasianella* by Lamarck; from both of which they are easily distinguished by their horny operculum; *Littorina* appears to be related in the same degree to *Phasianella* as *Trochus* is to *Turbo*.

As the name implies, the *Littorinæ* are found on and near the shore, where they may be seen in great abundance feeding upon the sea-weed, and from whence they are collected in great quantities for food. The common Periwinkle (*Turbo littoreus auctorum*) abounds on our own shores and we have several other species: the shell denominated *Nerita littoralis* by British authors, and which we believe to be *Turbo retusus* of Lam. is another species of this Genus very common on our shores. There are a great number of species of this Genus, found in almost all parts of the world: those of tropical climates are thinner in general than those of the more northern latitudes.

Shell spiral, turbinated, sometimes almost turrited; mostly thick and solid, sometimes rather thin; spire for

## LITTORINA.

the most part gradually acuminated, sometimes very short and obtuse; aperture elliptical, rather acute at the upper part, peritreme sharp-edged; columella rather flat; operculum horny, spiral, consisting of few volutions, increasing rapidly in width, its nucleus lateral.

There are several fossil species, found in the tertiary beds, and some others occur even as low as the Coral rag and the Inferior Oolite.

In our plate we have represented the following:

- Fig. 1. *Littorina vulgaris*, the common Periwinkle.  
2. ——— *pulchra*, *Turbo pulcher*, *Swainson*.  
3. ——— its operculum  
4. ——— *varia*, a new species from Panama.  
5. ——— *filosa*, a new species from S. America.  
6. ——— *obesa*, a new species from the South Sea Islands.

## TURRILITES.



**TESTA** univalvis, libera, spiralis, turrita, concamerata, spirâ sinistrorsâ, gradatim acuminatâ, septis siphunculo perforato, marginibus sinuosissimis.



THE only circumstance in which this Genus differs from Ammonites is its turritied form, the latter being spiral but having its volutions all increasing upon the same plane. There appear to us to exist, all in a fossil state only, five genera of shells with chambers whose septa are sinuous at their edges, namely, *Baculites*, *Hamites*, *Turrilites*, *Ammonites* and *Scaphites*, which are well distinguished by the form peculiar to each; but we think it unnecessary for the purposes of science to adopt genera such as Lamarck's *Ammonoceras*, founded upon a slight variation from perfect contiguity in the volutions: if we could adopt such a Genus we might for the same reasons raise almost every species to the rank of a Genus. Nautellipsites and Ammonellipsites appear to us to be founded on no better characters, indeed we are convinced that the elliptical form of both is only caused by compression in one particular direction, operating at the time of their imprisonment.

Shell univalve, free, spiral, turritied, chambered, spire sinistrorsal, gradually acuminate, septa perforated by a siphunculus, their margins much sinuated.

The shells of this Genus being only found in a fossil state, nothing is of course known of its animal, nor of the form of its aperture; it appears to have lived only at one particular period, as the fossil remains only occur in



## TURRILITES

the Chalk marl. Several species abound at Ringmer in in Sussex, and Mount St. Catherine near Rouen.

In our plate we have given a representation of part of a specimen which shows the form of the outer lip ; we were favoured with the use of this specimen by G. Mantel, Esq. of Lewes.

## CYCLAS.



TESTA tenuis, æquivalvis, subæquilateralis, epidermide olivaceâ induta, dentibus, cardinalibus minimis in utrâque valvâ duobus divergentibus, in alterâ valvâ altero bifido, lateralibus in alterâ valvâ binis, subdistantibus, subelongatis, in alterâ quatuor, duobus verè perexiguis; *impressionibus muscularibus* duabus, lateralibus, ovatis, *impressione musculari pallii* sinu nullo. *Ligamentum externum*, tenue.



THE Genus *Cyclas* as first established by Bruguière includes the two Lamarckian genera *Cyrena* and *Cyclas*, which appear to us to have been separated upon rather insufficient grounds, though we have already expressed our opinion that such separation may be convenient. The principal difference consists in the thinness of the *Cyclades*, whereas the *Cyrenæ* are comparatively thick and solid. We have already shown how little dependence should be placed upon the erosion of the umbones either as a generic or a specific character, the thicker individuals being constantly more eroded than the thinner, the *Cyclades* being very thin are consequently nearly if not quite free from erosion.

Shell thin, equivalve, generally nearly equilateral, covered with a thin olive green epidermis; there are two very minute diverging hinge teeth in each valve, one of which is double in one valve; the lateral teeth are rather distant and somewhat elongated, placed on each side of the hinge, of these there are two in one valve and four in the other, two of these latter are, however, very small. The muscular impressions are two in each valve, they are lateral and ovate, that of the mantle is entire without any sinus. Ligament external, slender.

## CYCLAS.

The recent species of *Cyclas* are peculiar to the northern hemisphere, and we believe are only found in the European and North American continents, they abound in ditches, ponds, slow streams and lakes, their little animals move about in the water with facility by the use of a flexible muscular foot, with which they appear to take hold of any substance within their reach and draw themselves toward it.\*

Such as occur in a fossil state appear only to belong to the most recent lacustrine formations, they are probably post diluvian and belong to the same species as are found living at the present time.

Several recent species occur in Britain, and some attempts have been made to divide them into several genera, we do not think such divisions necessary, particularly when it is considered that there are not many species and that the differences are but slight.

We have represented *Cyclas rivicola*.

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\* We had nearly forgotten to mention that most if not all the *Cyclades* are viviparous, i. e. that their young are completely formed before they are expelled from the ovary.

## PLEUROTOMA.



TESTA fusiformis, turrita, aperturâ ovali, canali plus minusve elongatâ, labio externo prope suturam emarginato; operculo corneo, infra acuminato, nucleo inferiore.



AN interesting Genus of elegantly fusiform univalves, separated from the Linnean Murices. The spire being in general much elongated and gradually tapering to a fine point; and a more or less elongated straight canal bring it near to *Fusus*, from which it is only distinguished by the notch in the upper part of the outer lip. To *Murex*, as we have already defined that Genus, it does not appear to be nearly related. Notwithstanding that in general the form of the *Pleurotomæ* is such as we have described it, there appears to us to be several variations of form brought together under this generic appellation; we think, however, that they cannot be separated. One of these variations of form is an approximation to *Strombus*, having a short canal and the outer lip somewhat expanded, some of these have also a notch near the lower part of the outer lip; another is an approach to the cones, having a very nearly straight columella and a linear aperture. Two genera, namely *Pleurotoma* and *Clavatula* were formed in 1801 by Lamarck to contain the shells which he has since united together in *Pleurotoma*, the one having been distinguished from the other principally by the shortness of the canal, some of the species which he then named *Clavatula* are, however, very peculiar and might perhaps without impropriety be separated from *Pleurotomæ*. Upon glancing over our collection of *Pleurotomæ* we observe several variations in form which it may not be amiss briefly to describe, they are as follows: *first*, with the spire and the canal nearly of equal length, a single keel near the middle of each volution, and a deep notch in the outer lip immediately *below* the keel, such are Pl. *Babylonica*, P. *Virgo* and others; *second*, with the canal rather shorter than the spire, a nodular keel near the middle of each volution and a deep notch in the outer lip *above* the keel, Pl. *Javanica* and *nodifera* are examples of this form; *third*, with

## PLEUROTOMA.

the canal rather shorter than the spire, the upper part of each volution thickened, with a groove beneath it, and the notch in the outer lip at the lower edge of the groove; this is one of Lamarck's *Clavatulæ*; *fourth*, with the canal shorter than the spire and the upper edge of the volutions muricated with strong spines, such is *Pl. muricata*, Lam.; *fifth*, with the aperture as long as the spire, and the canal not distinguished from the aperture by a contraction of the body of the shell, this leads to *Conus*; *sixth*, having the aperture and canal much shorter than the spire, and the outer lip more or less expanded with a slight notch near its lower end, leading to *Strombus*. We have thought it advisable to illustrate this subject by a representation of one of each of these variations.

The recent *Pleurotomæ*, although not remarkably numerous, appear to be spread over the coasts of all parts of the world, the finest species, nevertheless, belong to tropical climates; the fossil species, which are very numerous, principally abound in tertiary beds, they are found in great numbers in the *Calcaire grossier*, in the London Clay, in the contemporary beds near Bordeaux, and in the Appennines. Some very beautiful species are represented by Brocchi in his work on the fossil shells of the subappennine beds.

Shell fusiform, turrited, aperture oval, with a more or less elongated canal at the base; outer lip with a notch near the suture; operculum horny, acuminate and having its nucleus at the lower end: the operculum resembles that of *Fasciolaria* and *Strombus*, and some species have a thin epidermis, which appears, however, to be very deciduous. In several species there is a very narrow, but deep spiral groove just below the suture, which it is extremely difficult to distinguish from the suture itself, except at the edge of the outer lip; one of these remarkable species we have named *Pl. Cryptorrhaphe* and have given a description of it in the Tankerville Catalogue, appendix p. xiv.

It is to be observed that Lamarck's *Pl. buccinoides* belongs to his family of *Melaniens*, and we have a species, with whose locality we are unacquainted, but which we suppose to be a freshwater shell, in whose peculiar form the general characters of *Pleurotoma* are well marked, which nevertheless has the epidermis of the *Melaniens* and like them is decollated.

## PLACUNANOMIA.



**TESTA** adhærens, subæquivalvis, irregularis, complanata. Cardo dentibus duobus divaricatis, basi convergentibus in valvâ inferiore, sulcis duobus ligamentiferis in superiore. Valva inferior cardinem versus fissurata, organo adhæSIONIS subosseo inserto, fissuram implente. *Impressio muscularis* in utrâque valvâ subcentralis. In valvâ superiore organi adhæSIONIS impressio superaddita.



THIS interesting Genus partakes of the characters of the genera *Ostrea*, *Plicatula*, *Placuna* and *Anomia*. It may be regarded as the connecting link between the two latter. With an arrangement of the hinge approaching very nearly to that of *Placuna* we have the distinguishing organization of *Anomia*, while the external appearance of the shell, especially if viewed in situ, bears the strongest resemblance to a *Plicatula*, or some of the plicated Oysters. The organ of adhesion, which in its bony character (for it is rather bony than shelly) resembles that of *Anomia*, does not perforate the lower valve directly, but is inserted between the laminae of the internal surface of the lower valve above the muscular impression, (for *Placunanomia* has but one in each valve) and below the hinge and passes out into an external, irregular, somewhat longitudinal superficial fissure or cicatrix, narrowest at the hinge margin and which it entirely fills to a level with the surrounding surface of the shell.

We have met with three species of this curious Genus, that which appears to be typical was brought by Mr. Henry Cuming from the Gulf of Dulce in the Province of Costa Rico: it has been named *P. Cumingii*, and our representations are taken from two of his specimens. Of the other two species one is from Luçon, one of the Philippine Islands, the other has been occasionally found adhering to Madrepores in the West Indies.

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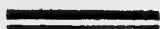
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## STYLIFER.



**TESTA** hyalina, turbinata, apice spiræ mucronato. Apertura subovata, supernè acuminata. Labrum acutum, sinuatum.

Pallium crassum, carnosum, cyathiforme, testæ anfractus ultimos obtegens. Proboscis longissima, retractilis. Tentacula rotunda, crassa, subacuminata, ad basin proboscidis posita. Oculi ad basin tentaculorum sessiles, minima. Branchiæ stirps solitaria. Animal marinum, Asteriæ cutem penetrans.



THE arrival in this country of the shell above recorded with the soft parts has afforded data for a generic character, indicating a distinct family among the Pectinibranchiata, the form and disposition of whose mantle differs from that of any other genus in the order. This mantle, which is of green hue, is thick, fleshy and cup-shaped with a small aperture at its base, and a free posterior margin, enveloping the soft parts and the last volutions of the shell, which has thus somewhat the appearance of a small acorn set in its cup. On the ventral aspect of this mantle is the rudiment of a foot, and from the small basal aperture a retractile proboscis, which, when exerted is as long as the whole animal, is protruded. At the base of the proboscis are two thick, round, somewhat pointed tentacula; and at the base of them are the eyes, or rather ocular specks without pedicles. The branchia is placed on a single stem. At the base of the proboscis is a spherical muscular stomach, and the intestine ascends into the spire of the shell, where it becomes attached to the liver, which in the species before us is of an orange colour. Mr. Cuming found this elegant parasite burrowed in different parts of the rays of the oral disc of *Asterias solaris*. It is almost hidden from sight, so deeply does the



## STYLIFER.

animal penetrate into the substance of the Star-fish, in which it makes a comfortable cyst for itself, wherein it most probably turns by the aid of its rudimentary foot. All the specimens infested with Styliferi appeared to be in the best health though there is reason to believe that they feed upon the juices of the Star-fish. With that instinct of self-preservation imparted to all parasites, whose existence depends upon that of their nidus, the Stylifer, like the Ichneumon among Insects, appears to avoid the vital parts; for in no instance did Mr. Cuming find it imbedded anywhere, save in the rays, though some had penetrated at their base and very near the pelvis. When extracted the older shells have much the appearance of a milky clouded glass bubble; the younger shells are of an unclouded transparency.

Dr. Turton in the second volume of the Zoological Journal p. 367, plate 11, describes and figures a shell under the name of Phasianella stylifera, adding that he found a dozen attached to the spines of Echinus esculentus dredged up in Torbay. It is clear that Dr. Turton's shell is not a Phasianella, for it is described as having no operculum and the similarity of the shell leaves no doubt, when joined to the parasitic habits of the animal, that it is one of the congeners of Stylifer astericola.

Mr. Sowerby has furnished me with a third species, which, although its habits are unknown to me, I consider to be referrible to this Genus, and I propose to name it Stylifer subulatus; it is so beautifully transparent that in fine specimens the columella can be as distinctly seen as if there were no intervening medium; and its long apex, which consists of many close-set whorls is generally out of the perpendicular.

W. J. BRODERIP.

### In our plate we have represented at

Fig. 1. A portion of *Asterias solaris*, showing the Stylifer Astericola in its cyst.

2. Stylifer Astericola, of the natural size.

3 and 4. ————— magnified.

5. Stylifer subulatus, of the natural size.

6 and 7. ————— magnified.

8. Stylifer Astericola with its animal, dorsal aspect, magnified.

a. Oval orifice of the mantle. b. generative (?) organs.

## CAPULUS.

*Montf.*Pileopsis, *Lam.*

TESTA obliquè conica, posticè recurva, apice uncinato, sub-spirali; aperturâ magnâ, rotundato-ellipticâ; *impressionibus muscularibus* duabus, lateralibus, posticè connatis, utrâque anticè rotundatâ. Epidermis cornea, subvelutina.



THIS Genus may be regarded as a remarkable instance of the importance of a correct knowledge of the animal which forms it, as well as of the characters of the shell itself. We have long entertained the opinion that the animal of this Genus (of which the well known *Patella ungarica* may be regarded as the type) must be a gastropod and consequently very different from that of De France's *Hipponyx*, which is a truly bivalve shell. It may here be observed that in the bivalve mollusca the mantle envelopes the animal and lines the inside of the shell, depositing testaceous matter on its whole internal surface; the *Hipponyx* is therefore a true bivalve, for its animal must be wholly enveloped in its mantle, or testaceous matter could not be deposited on all sides: but in the present Genus, which has been very erroneously united to *Hipponyx* by De France and Lamarck (on account, no doubt, of their general resemblance in form) there is a distinct head, with tentacula and eyes, and the branchia are arranged in a single row behind the head, there is moreover a small, nearly circular foot, by which it is usually found adhering to oysters and other shells, stones, &c. all which circumstances prove that it cannot produce a second valve, and that it is not, therefore, even related to *Hipponyx*. The shell itself also differs from the upper valve of *Hipponyx*, for in *Capulus* it is obliquely conical and curved backwards,\* uncinatè and somewhat spiral; in *Hipponyx*, however, though it is obliquely conical,

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\* Throughout his description of *Pileopsis*, Lamarck has mistaken the front for the back, and *vice versa*.

## CAPULUS.

it is not recurved, nor is it in the least spiral. We are fully aware that in full grown specimens of some of the Capuli the beak is not recurved, but we observe that in the young shells of the same species it is distinctly so. It is somewhat singular that although the Capuli are gasteropods they do not appear to remove from the spot to which they were at first attached, but like several of the Patellæ they seem to form, probably by a chemical action, a more or less deep cavity in the surface to which they adhere; this circumstance alone, should, as we think, be sufficient to distinguish the Capuli from the Hipponyces, for it is evident that an animal with a mantle capable of depositing testaceous matter, cannot at the same time erode the spot to which it is affixing such calcareous deposit. But there is a circumstance in the peculiar form of the impression made by the foot of the Capulus which it appears is difficult to understand, for the margin of this impression is sometimes more or less raised in a somewhat horse-shoe form, apparently corresponding to the muscular impressions in the lower valve of Hipponyx: we think this peculiar form may be caused by the contraction and expansion of the nearly circular foot in raising and depressing the shell, in order to permit the entry and egress of the sea water.

Shell obliquely conical, recurved behind, with an uncinate rather spiral apex; aperture large, elliptical; muscular impressions two, lateral, joined together at the back, each rounded in front. Epidermis horny, thick, somewhat velvety.

This Genus consists entirely of Marine shells, which are frequently found adhering to oysters and other shells; one species, namely, the *C. Ungaricus* abounds on our coasts, and others are found in the Pacific and in the East and West Indies. We are not acquainted with many recent species. Several are common among the fossils of the tertiary beds.

We have represented in the upper figure a specimen of *Capulus Ungaricus* as it commonly appears attached to an oyster shell and in the lower figure the inside of the same species.

We are obliged to the Right Hon. Lady Elizabeth Finch for living specimens brought from Tenby in January, 1832.

## SOLARIUM.



TESTA subdiscoïdea, latè umbilicata, spirâ obtusè conicâ, aperturâ trapeziformi, peritremate tenui, acuto, umbilico margine spirali crenato; operculo corneo, sub-spirali.



THE shell commonly called the *Staircase Trochus* has, from the time of its being first known, been deservedly celebrated among collectors, on account of the beauty and symmetry of its external form and its elegantly crenated spiral umbilicus. This was placed by Linné among the Trochi, to which indeed it appears to us to be nearly related. It has, however, been since separated, and forms conjointly with its more closely related species the modern Genus *Solarium*. This we have adopted without hesitation, because we find a number of shells distinguished specifically, but yet agreeing in certain generic characters which therefore in our view, form a natural genus.

The shells forming this Genus are usually of a somewhat discoidal form, with an obtusely conical spire, the lower edge rather sharply angular, and the umbilicus broad and deep: they vary, however, occasionally, in a slight degree from this general form, having the spire sometimes of a rather more lengthened conical form, the basal edge more obtuse, angular, and the umbilicus broad and deep. The umbilicus has, in almost all instances its spiral lower margin strongly and closely crenulated, though occasionally this also is subject to some variation, as in the *S. patulum*, for example, in which this spiral lower margin of the umbilicus has only a few small grains placed here and there at a distance from each other. The aperture is trapeziform, with more or less rounded angles, and a thin sharpish peritreme. A thin horny epidermis covers the shell in its natural state; this is either very

## SOLARIUM.

deciduous or must in general have been carefully cleared off before the shell is brought to England, for it is scarcely ever to be seen. The operculum which is horny, varies in form, according nearly in shape with the aperture; it is foliaceous and more or less distinctly spiral; in one species its foliated edge forms an elevated spiral cone on the outer side; this outer side is, however, flat in the common species; the inner side in both species has an irregular, somewhat lateral tubercle.

*Solarium* appears to be most nearly related to Trochus; its recent species are not numerous, but they seem mostly to belong to tropical climates: a few fossil species occur in the tertiary beds; and there are some fossils belonging to the lower beds of oolitic formation, and even as low as the Mountain Limestone which resemble them very nearly; these form the genus *Cirrus* of some authors, and does not appear to us to possess any characters by which it may be generically distinguished from the Trochi, Turbines or Solaria.

We have given two views of *Solarium perspectivum*, and of its operculum; and also a representation of the small spiral operculum of *S. variegatum*.

## APLYSIA.



**TESTA** clypeiformis, tenuis, pellucidâ, præcipuè cornea, compressa, posticè acuminatiusecula, dorso convexo, anticè lamellari, rotundata.



RELATED to Dolabella, and united to it by DeFerussac, who has favoured naturalists with a very complete account of the family. It is remarkable that the shell, which consists almost entirely of horny epidermis, is nearly covered by the integuments of the animal; it seems to serve as a protection to the pectinated branchiæ. The animal is much larger than the shell, and when it rests not unaptly resembles the hare crouching upon the ground, whence it has the common appellation of *Sea Hare*, *Lievre marin*, &c. Its singular structure, together with its anatomical peculiarities are well described by Cuvier in his *Memoires sur les Mollusques*. It may not, however, be uninteresting here to mention that when disturbed this animal transudes a quantity of purple liquor which has been supposed to possess depilatory properties, but which we apprehend to be rather intended to conceal the animal from its enemies.

Shell clypeiform, thin, pellucid, consisting for the most part of horny epidermal matter, with a very little testaceous matter within; it is of a somewhat oval shape, convex on the back, rather acuminated at the posterior extremity, rounded and very thin and lamellar in front.

The Aplysiæ, which have been improperly called Laplysiæ\* are marine; they appear to belong to all cli-

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\* Lamarck has very improperly endeavoured to perpetuate an accidental error in the name given by Linné to this animal, by continuing to call it Laplysia and bringing a false charge against later naturalists of changing it to Aplysia. The ancient word is *Aplysia*, as Cuvier has shown, which signifies, "that which is unclean."

## APLYSIA

mates. Several are found on our own shores. We have never met with any fossil remains of the shell of this Genus.

We have figured in our plate

- Fig. 1. *Aplysia Petersoni*, 2 views.  
2. ——— *Brasiliensis*?  
3. ——— *concava*, nobis.  
4. ——— *quadrata*, nobis.



## FUSUS.



**TESTA** fusiformis, turrita, anfractibus plurimis, plerumque rotundatis, canali recto, plus minusve elongato, aperturâ ellipticâ; operculo corneo, infra acuminato, nucleo inferiore.



ANOTHER of those genera which has properly been separated from the Linnean Murices, from which it is sufficiently distinct. The species of this Genus are for the most part more or less regularly fusiform, with a turreted and gradually acuminate, usually pointed, though occasionally mammillary spire, consisting of numerous, generally rounded volutions, which are frequently transversely ribbed and spirally grooved on their outside; aperture elliptical, running into a more or less lengthened straight canal; operculum horny, with its nucleus at its acuminate lower end; a thin horny, more or less rough or velvety epidermis, usually covers the shells of this Genus in their natural state.

In this Genus, as in *Pleurotoma*, there are several variations in form, which we will here endeavour to describe, and which we will illustrate in our plate: the first, which may be called the typical form, as being that from which it takes its name, has its spire and its canal of equal length, its aperture elliptical, its last volution ventricose, and the canal narrow, commencing by a sudden contraction at the base of the aperture; *Fusus Colus*, and *Fusus nicobaricus* are examples of this form: next we may mention those which approach in form to our *Pyrulæ*, and many of which Lamarck has united to his *Pyrulæ*, these have a shortened spire, a somewhat lengthened canal, and the last volution is ventricose at its upper part, being sometimes tuberculated, and even having strong vaulted spines around the upper part of the volutions; for examples of



## FUSUS.

this variation observe *F. colosseus*, *F. Cochlidium*, and *Pyrula Vespertilio*, and others of Lamarck. A third variation in form, approaching to *Buccinum*, consists of a number of species whose spire is more lengthened than the canal, which is short, and not quite straight; the greatest gibbosity of the shell in these is below the middle; *F. lignarius*, *F. nifat*, *F. articulatus*, &c. are characteristic of this variation: the fourth variation in form consists of those species which, having in general nearly the same form as the first mentioned variation, namely, that of *Fusus colus*, and which have two or three small horizontal folds at the base of the columella, immediately above the contraction of the canal;\* *F. infundibulum*, *F. craticulatus*, *F. polygonus*, *F. cariniferus*, *F. lineatus*, are some of the species belonging to this division. It is worthy of remark respecting the five last mentioned shells that Lamarck had formerly placed the three first among the *Fusi*, and the two latter among the *Fasciolaria*, though at length he placed all five among the *Turbinelli*. Other variations in form there are, which we rather hesitate to unite with *Fusus*, partly because we are but slightly acquainted with them, and partly because they are so peculiar, that we fear we might be charged with forming an incongruous association by so doing, inasmuch as we should be scarcely able to convince naturalists of its propriety. These are, first, the *Turbinella rustica* of Lamarck, which is a thick, solid, oval shell, with a gradually tapering short spire, and a short canal, in its general shape it is much like *Fusus Bulbulus* of Lamarck, a very common Fossil in the London Clay, and the *Calcaire grossier*, but differs from that species in having three small horizontal folds at the base of the columella: secondly, two other shells named by Lamarck, *Turbinella leucozonalis* and *T. cingulifera*: we believe these two to be really only varieties of one species, which is very peculiar, and forms a sort of link connecting the *Fusi* with Lamarck's *Monoceros cingula-*

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\* Under the article *Fasciolaria* in this work we have suggested that it might not be improper to separate these as a distinct Genus; we are not however satisfied of the necessity of adopting this proposition; and we place them with *Fusus* as being incontrovertibly more nearly related to that Genus than to *Fasciolaria* or *Turbinella*, to both of which some of them have been united.

## FUSUS.

tum; the circumstance for which it is remarkable is that it has a more or less distinct tooth projecting from near the base of the outer lip, which is sometimes much lengthened, though it is more commonly nearly obsolete; thirdly, several species nearly agreeing in form with the last mentioned, though differing in the characters of the columella, near the center of which is a remarkable tubercular prominence, they have also three small horizontal folds at the base of the columella. The opercula of all the above are alike in form, only differing in thickness a little.

We have already, under the article *Murex*, shown that the *M. Magellanicus* should be arranged with the *Fusi*, it nearly resembles in form our common *Fusus despectus* or *antiquus* (*Murex antiquus*, *nonnull.*) There is a very remarkable shell, commonly known under the name of *Murex aruanus*, Linn., but called *Fusus proboscidi-ferus* by Lamarck, the apex of its spire for about three-fourths of an inch from the commencement is cylindrical, consisting of several volutions; this shell grows to be much the largest of the genus we are acquainted with, we have seen it two feet in length.\*

The *Fusi* are all marine, and they do not appear to be confined to any particular part of the globe; the species are very numerous and several very common on our coasts. The fossil species are also very numerous, several of them abound in our London Clay formation, and in the Calcaire grossier, and they are chiefly found in the tertiary beds. The *F. contrarius* of Lamarck is characteristic of the English Crag, and a very nearly similar species is found in Sicily, both in a recent and fossil state.

Our plate represents at

- Fig. 1. *Fusus longissimus*, young.  
 2. ——— *aculeiformis*  
 3. ——— *Colosseus*, young.  
 4. ——— *striatus*.  
 5. ——— *Nifat*.

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\* Linné refers to Gualt. Test. t. 47, f. B. for a representation of his *Murex Aruanus*, which certainly is not the *Fusus proboscidi-ferus* of Lamarck.

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1. The first step in the process of the development of a new product is the identification of a market need. This is often done through market research, which can be conducted in a variety of ways, including surveys, focus groups, and interviews. The goal is to understand what customers want and need, and to identify any gaps in the current market.

*Journal of Management Studies*, 19(1), 1-16.

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1. *Journal of the American Medical Association*, 1997; 278: 1025-1030.

1. The first step is to identify the problem or question that needs to be answered. This involves understanding the context and the specific requirements of the task.

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1. The first step in the process is to identify the problem or issue that needs to be addressed. This involves gathering information and understanding the context of the problem.

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## DELPHINULA.



**TESTA** subdiscoïdea, vel subconica, umbilicata, solidiuscula, anfractibus asperis aut angulatis; aperturâ integrâ, rotundatâ, peritremate, continuo, incrassato, subreflexo; operculo corneo, spirali, anfractibus numerosis, confertissimis.



**DELPHINULA** is a Genus which has been separated by Lamarck from the Linnean Turbines, taking *T. Delphinus* as the type. In it he has associated shells of great diversity of character, such as the *D. laciniata*, *D. trigonostoma*, *D. conica*, and *D. Warnii*. The group thus formed does not appear to us to be quite natural, and we would render it more so by taking away *D. trigonostoma* and placing it with the Cancellariæ, its natural associates. We would take away *D. conica* also, if we knew where to place it, but it is a fossil and we are not well enough acquainted with its affinities to venture an attempt at altering its place.

The name of *Dolphin* in English and *Delphinula* in Latin has been given to the *D. laciniata*, as we suppose from some fancied resemblance to a cetaceous fish.

The *Delphinulæ* vary in general form from nearly discoid to somewhat conical; they are umbilicated and generally of a thick solid substance, the volutions few, more or less rough and angular; the aperture entire, round, with a continuous, thickened and somewhat reflected peritreme: operculum horny, like that of the *Trochi*, with very numerous and closely-set volutions.

The species which may with propriety be placed in this genus are not numerous, as far as we know there may be about a dozen recent and as many fossil, most of these latter belonging to the tertiary beds. Several of these which have been found in Normandy are most elegant fossils; such are *D. Gervillii* and *D. Warnii*.

- Fig. 1. *Delphinula laciniata*.  
 2. ————— its operculum.  
 3. ————— *crenata*, nobis.

1999

1997

The following information was obtained from the records of the Department of the Interior, Bureau of Land Management, regarding the land owned by the United States in the State of California:

1. The total area of land owned by the United States in California is approximately 100 million acres.

2. The majority of this land is located in the western part of the state, particularly in the Sierra Nevada mountains and the coastal regions.

3. The land is managed by various agencies, including the Bureau of Land Management, the National Forest Service, and the Fish and Wildlife Service.

4. The land is used for a variety of purposes, including timber production, grazing, recreation, and conservation.

5. The value of the land is estimated to be over \$1 billion.

The first of these is the fact that the  
 government has been unable to raise the  
 necessary funds to meet its obligations.  
 This has led to a severe financial crisis,  
 which has resulted in the government  
 being forced to seek assistance from  
 international organizations. The second  
 factor is the fact that the government  
 has been unable to implement the  
 necessary reforms to improve the  
 economy. This has led to a severe  
 economic crisis, which has resulted in  
 the government being forced to seek  
 assistance from international organizations.  
 The third factor is the fact that the  
 government has been unable to maintain  
 the necessary level of public order and  
 security. This has led to a severe  
 social crisis, which has resulted in the  
 government being forced to seek  
 assistance from international organizations.  
 The fourth factor is the fact that the  
 government has been unable to maintain  
 the necessary level of public order and  
 security. This has led to a severe  
 social crisis, which has resulted in the  
 government being forced to seek  
 assistance from international organizations.  
 The fifth factor is the fact that the  
 government has been unable to maintain  
 the necessary level of public order and  
 security. This has led to a severe  
 social crisis, which has resulted in the  
 government being forced to seek  
 assistance from international organizations.  
 The sixth factor is the fact that the  
 government has been unable to maintain  
 the necessary level of public order and  
 security. This has led to a severe  
 social crisis, which has resulted in the  
 government being forced to seek  
 assistance from international organizations.  
 The seventh factor is the fact that the  
 government has been unable to maintain  
 the necessary level of public order and  
 security. This has led to a severe  
 social crisis, which has resulted in the  
 government being forced to seek  
 assistance from international organizations.  
 The eighth factor is the fact that the  
 government has been unable to maintain  
 the necessary level of public order and  
 security. This has led to a severe  
 social crisis, which has resulted in the  
 government being forced to seek  
 assistance from international organizations.  
 The ninth factor is the fact that the  
 government has been unable to maintain  
 the necessary level of public order and  
 security. This has led to a severe  
 social crisis, which has resulted in the  
 government being forced to seek  
 assistance from international organizations.  
 The tenth factor is the fact that the  
 government has been unable to maintain  
 the necessary level of public order and  
 security. This has led to a severe  
 social crisis, which has resulted in the  
 government being forced to seek  
 assistance from international organizations.

Figure 1. The effect of the concentration of the *Agrobacterium* suspension on the transformation efficiency of *Agrobacterium* strains. The concentration of the *Agrobacterium* suspension was 10<sup>6</sup> cells/ml (a), 10<sup>7</sup> cells/ml (b), 10<sup>8</sup> cells/ml (c), and 10<sup>9</sup> cells/ml (d). The concentration of the *Agrobacterium* suspension was 10<sup>6</sup> cells/ml (a), 10<sup>7</sup> cells/ml (b), 10<sup>8</sup> cells/ml (c), and 10<sup>9</sup> cells/ml (d). The concentration of the *Agrobacterium* suspension was 10<sup>6</sup> cells/ml (a), 10<sup>7</sup> cells/ml (b), 10<sup>8</sup> cells/ml (c), and 10<sup>9</sup> cells/ml (d). The concentration of the *Agrobacterium* suspension was 10<sup>6</sup> cells/ml (a), 10<sup>7</sup> cells/ml (b), 10<sup>8</sup> cells/ml (c), and 10<sup>9</sup> cells/ml (d).

## BULLA.



Bulla and Bullæa, *Lam.*



**TESTA** plerumque tenuis, lævigata, ovata, vel oblonga, plus minusve convoluta, spirâ brevi, vel depressâ, vel concavâ; aperturâ maximâ, ferè longitudinem testæ æquante, plerumque longitudinali, nonnunquam ferè transversâ, rarò lineari, antice latiore : epidermide tenui.



IN uniting the Bullææ of Lamarck with his Bullæ, we think we are justified by the consideration that there is so complete a transition in form from the oval and ventricose Bullæ, such as *B. Ampulla*, to the only slightly convoluted, and almost unrolled Bullææ, that it is impossible to draw the line of separation between the two. Perhaps we may be blamed by Malacologists for thus uniting shells whose animals apparently differ very materially, we think, however, that whoever will carefully examine the animals of both, will be convinced of the propriety of this union, for a general resemblance and affinity will be observed and it will be found that the principal points of difference will be analogous to those very specific circumstances in which the shells differ.

The Genus *Bulla* as it has been established by Cuvier, Lamarck and others consists of only a very small part of the Linnean Bullæ. We have already shown how widely separated from genuine Bullæ are the Lamarckian *Achatinæ*, *Pyrulæ*, *Ovulæ* and others which Linnè and his followers combined with them, wherefore we need not here repeat the description of their distinguishing characters, but may immediately enter upon the characters of *Bulla* as we have here considered it, as consisting of Lamarck's *Bulla* and *Bullæa* combined.



## BULLA.

The Bullæ are generally oval, more or less spirally convoluted univalves, sometimes having a distinct, though short spire, and not unfrequently a depression in place of the spire : they are mostly thin, and generally varied in their coloration, though occasionally of an uniform colour and sometimes even colourless ; aperture generally large, and nearly as long as the shell, for the most part longitudinal, though sometimes almost transverse, in most species wide and much wider anteriorly or at the lower part than at the upper, in some instances very wide and spreading, and very seldom narrow and almost linear, always effuse at the lower extremity. On one side the Genus Bulla appears to approximate in general appearance to Tornatella, some of its species, the *B. Amplustre*, for example, having nearly the same form ; and on the other side to the Aplysiadæ, the *B. aperta* approaching very nearly in form to the Dolabellæ. A circumstance remarkable in the animal of the Bullæ is the form and structure of the stomach, which in most of them consists of three strong shelly pieces united by powerful adductor muscles ; we suppose such a structure to be necessary to their existence, for they are exceedingly voracious as is evident from the fact that the animal of *B. aperta* is sometimes distorted by having swallowed entire a *Corbula Nucleus*, which is a very thick and strong shell, nearly equal in size to itself.

The Bullæ are marine, and they appear to belong to nearly all climates ; several are common on our own coasts ; very few of them grow to be so large as a Walnut and they are for the most part much smaller. Fossil species are only to be distinguished in the tertiary beds and in the green sand.

In our plate we have given representations of

Fig. 1. *Bulla aperta*, (Bullæa, Lam.)

- 2. — *virescens*, nobis.
- 3. — *Lignaria*.
- 4. — *Ampulla*.
- 5. — *calyculata*.
- 6. — *Physis*.
- 7. — *cylindrica*.
- 8. — *Amplustre*.

## SOLENELLA.



TESTA ovalis, æquivalvis, subæquilateralis, compressa, nitens, epidermide olivaceo-viridi, tenui, indutâ; dentibus, cardinalibus nullis, lateralibus anticis, in utrâque valvâ, tribus ad quatuor, lateralibus posticis plurimis, seriem rectiusculam efformantibus, omnibus parvis, acutis; *impressionibus muscularibus* duabus, lateralibus, subdistantibus; impressione pallii sinu magno; ligamento externo, elongato.



AN interesting Genus partaking of the characters of *Nucula* and *Solen*, so that it may be regarded as the link connecting the two families of the *Solenaceæ* and the *Mac-traceæ*. It belongs to the *Solenaceæ*, having the external ligament and the large sinus in the muscular impression of the mantle, but resembles *Nucula*, which belongs to the *Mac-traceæ* in having the lateral teeth divided into series of minute and pointed teeth, differing from it, however, in not having an internal ligament.

Shell longitudinally oval, equivalve, nearly equilateral, compressed, shining, covered with a thin olive-green epidermis; it has no cardinal teeth, and in each valve only three or four very small *anterior lateral* teeth; the *posterior lateral* teeth, however, are numerous and form a nearly rectilinear series, they are moreover small and sharp pointed, those of one valve exactly fitting between those of the other; this series of small teeth is placed immediately below the fulcrum to which the external, elongated ligament is attached. The muscular impressions are two, lateral and rather distant, and there is a large sinus in that of the mantle.

A few specimens of this very interesting bivalve were dredged by Mr. H. Cuming at Valparaiso.

It is the only species we have seen, but Mr. Cuming informs us that he has met with another. We have named it *Solenella Norrissii*.





## CLASS.

## PTEROPODA.



WE have thought it desirable, in order to give a general view of the family, and at the same time to save as much space as possible, to assemble such genera of the Pteropoda as we are able to illustrate, in two plates. This is a small family and may be more easily illustrated consecutively, particularly as the various genera of which it is composed resemble each other to a great degree. Scarcely any of the Pteropoda were known to Linnean writers on conchology, the only one that we recollect in any Linnean work before the modern improvements of Cuvier, Lamarck, &c. being the *Hyalæa tridentata* which is in such works named *Anomia tricuspidata*: than which nothing could be much more absurd, since, independently of the important differences existing between the animals, it is well known that the Linnean Anomiæ are bivalves, while the Hyalæa and all the Pteropoda are univalves. Cuvier in his *Mémoires sur les Mollusques*, has shown that the Pteropoda are a separate family or class, distinguished by certain peculiarities, the organs of locomotion being shaped like wings, the whole of them being free swimmers, and their shells in general having a peculiarly transparent, brittle, and vitreous character. The genera of this family which we shall here illustrate, are Hyalæa, Cleodora, Limacina, Creseis, Vaginula, Cuvieria, and Cymbulia. They are mostly found swimming about in the sea in all climates, and in some they abound to such a degree that they are said to be the chief food of the cetaceous mammifera. Besides the above-named genera, there are others belonging to the same family, which are, however, destitute of shell; we suspect, moreover, that the little transparent shell called *Dentalium Gadus*, by Montagu, will prove, when its animal is known, to belong to this family. The whole of the Pteropoda are marine, and they appear to belong to all climates.

## PTEROPODA.

### HYALÆA. Fig. 1.

Testa subglobosa, tenuis, hyalina, fragillima, dorso supernè subrostrato, infra tridentato, dente centrali validiore, apice pervio; ventre supernè gibboso, brevior, aperturâ lineari, supra-ventrali, ad lateres continuâ.

THE Hyalææ are in general nearly globular, very thin, transparent and brittle; they may be regarded as constituted of two parts, united together at the lower edge, one part being apparently dorsal, larger than the other, reflected and subrostrated at the upper end, tricuspidate and united to the ventral portion by the edge below; the central tooth being the longest, and open at the end; the other part appears to be ventral, which is shorter and gibbous above; the aperture is linear, continuing between the dorsal and ventral parts at the upper end, and on both sides.

Occurs in a fossil state in Sicily.

### CLEODORA. Fig. 2.

Testa inversè pyramidalis, hyalina, incolorata, tenuissima, fragillima, dorso supernè rostrato, infra acuminato, ventre supernè brevior, lateribus acuminatis, aperturâ magnâ, supra-ventrali, ad lateres coarctatâ.

THE Cleodoræ differ from the Hyalææ principally in the form of their shells; they are even thinner, more transparent, more brittle and altogether more delicate; and they have the appearance of the thinnest and most transparent glass.

Shell inversely pyramidal, transparent, colourless, extremely thin and fragile, dorsal portion rostrated at the upper extremity, and acuminate at the lower; ventral portion shorter above, angular and acuminate on the sides; aperture large, dilated in the middle, smaller and contracted on the sides, placed above between the dorsal and ventral portions.

## PTEROPODA.

## LIMACINA. Fig. 3.

**Testa tenuis, fragilis, spiralis, discoidea, lateribus umbilicatis, dorso et subtus carinata, carinâ membranaceâ, lamellari.**

WE have been favoured with this very curious little shell from Messina, by the Rev. Robert Wilson. It has externally much the appearance of a very diminutive umbilicated Nautilus. It differs from the other Pteropoda principally in being convoluted; and it may be described as a thin, fragile, spiral, discoid shell, umbilicated on both sides, and carinated on the back and below, with a membranaceous lamellar keel.

## CRESEIS. Fig. 4.

**Testa inversè pyramidalis, hyalina, tenuissima, fragillima, subtus acuminata, supernè aperta, parte dorsali longiore; lineâ dorsali semitortâ ex vertice ad basin decurrente.**

SHELL inversely pyramidal, transparent, very thin and brittle, pointed at the lower end, wider and open at the upper, dorsal part more lengthened and pointed, with a partly twisted line running from the vertex to the base.

Found in the Mediterranean.

## VAGINULA. Fig. 5.

**Testa inversè pyramidalis, tenuis, fragillima, medio ventricosiusculo; infra acuminata, aperturâ minimâ; supernè lateribus æqualibus, aperturâ magnâ, oblongâ.**

SHELL of an inversely pyramidal form, thin, very brittle, rather ventricose in the middle, acuminate and having a very small aperture at the lower extremity; upper end with both sides equal, and a large oblong aperture.

Only known in a fossil state, in tertiary beds near Bordeaux.

## PTEROPODA.

### CUVIERIA. Fig. 6.

Testa subcylindrica, vitrea, hyalina, tenuissima, fragillima, medio ventricosiuscula, infra obtusa, clausa, supernè subcompressa, aperturâ magnâ, oblongâ; latere dorsali elevatiusculo.

SHELL subcylindrical, glassy, transparent, very thin and brittle, rather ventricose in the middle, obtuse and closed below; slightly compressed at the superior extremity, with a large oblong opening, dorsal margin rather higher than the ventral.

Found in the Mediterranean.

### CYMBULIA. Fig. 7.

THIS Pteropod of which we have added three representations, with its boat-shaped integument, has no shell, though it has usually been described as having one. We do not therefore give any description of it, and only observe that the above-mentioned boat-shaped integument, which has been described as a *gelatinoso-cartilaginous shell*, is an exceedingly transparent horny substance, not in any wise testaceous. This with its animal is occasionally thrown ashore at Nice.

## ANATINELLA.



**TESTA** ovata, æquivalvis, subæquilateralis, latere antico rotundato, postico subrostrato, subtruncato; ligamento interno, processui cochleariformi affixo, dentibus duobus cardinalibus in utrâque valvâ ante processum positis: *impressionibus muscularibus* duabus, anticâ oblongâ, irregulari, posticâ subcirculari; *impressione musculari pallii* integrâ: appendice cardinali internâ nullâ.



Odd valves of this remarkable shell were brought to England many years since by the late celebrated Dr. Solander, which, however, being imperfect, it was impossible to place with certainty. The arrival of a few perfect specimens lately from Ceylon has enabled us to ascertain the characters by which it is distinguished from other genera to which it appears most nearly related. We have named this Genus *Anatinella* on account of its' general resemblance to *Anatina*; from that, however, it may be known by its being destitute of the testaceous cardinal appendage and the sinus in the muscular impression of the mantle which characterizes that Genus. From *Mya*, *Lutraria* and *Amphidesma* it is also distinguished by having no sinus in the pallial impression. In having the pallial impression entire, and in the characters of the hinge it approaches somewhat to *Crassatella*, it is not, however, a ponderous, but rather a thin shell, moreover, it has not the thick epidermis nor the lateral tooth of that Genus. We think it properly placed near to it.

## ANATINELLA.

Shell ovate, equivalve, nearly equilateral, the anterior side being rounded, and the posterior slightly beaked and subtruncated. The ligament is internal, and fixed to a spoon-shaped process in each valve, on the anterior side of which are placed two rather elongated cardinal teeth. Muscular impressions two, lateral, distant, that which is anterior being oblong and irregular, and the posterior being nearly circular. Muscular impression of the mantle entire, without any sinus. No clavicle or testaceous appendage before the ligamentiferous process.

Only one species is known, which is found in the sands on the coast of Ceylon.

## CUMINGIA.



**TESTA** bivalvis, inæquilateralis, æquivalvis, latere antico rotundato, postico subacuminato; dentibus, cardinali in utrâque valvâ unico, parvo, antico; lateralibus in alterâ valvâ ad utrumque latus uno, valido, in alterâ nullo: ligamento interno foveolæ subcochleariformi affixo; *impressionibus muscularibus* duabus, lateralibus, distantibus, anticâ irregulari, oblongâ, posticâ subrotundatâ, *impressione musculari pallii* sinu maximo.

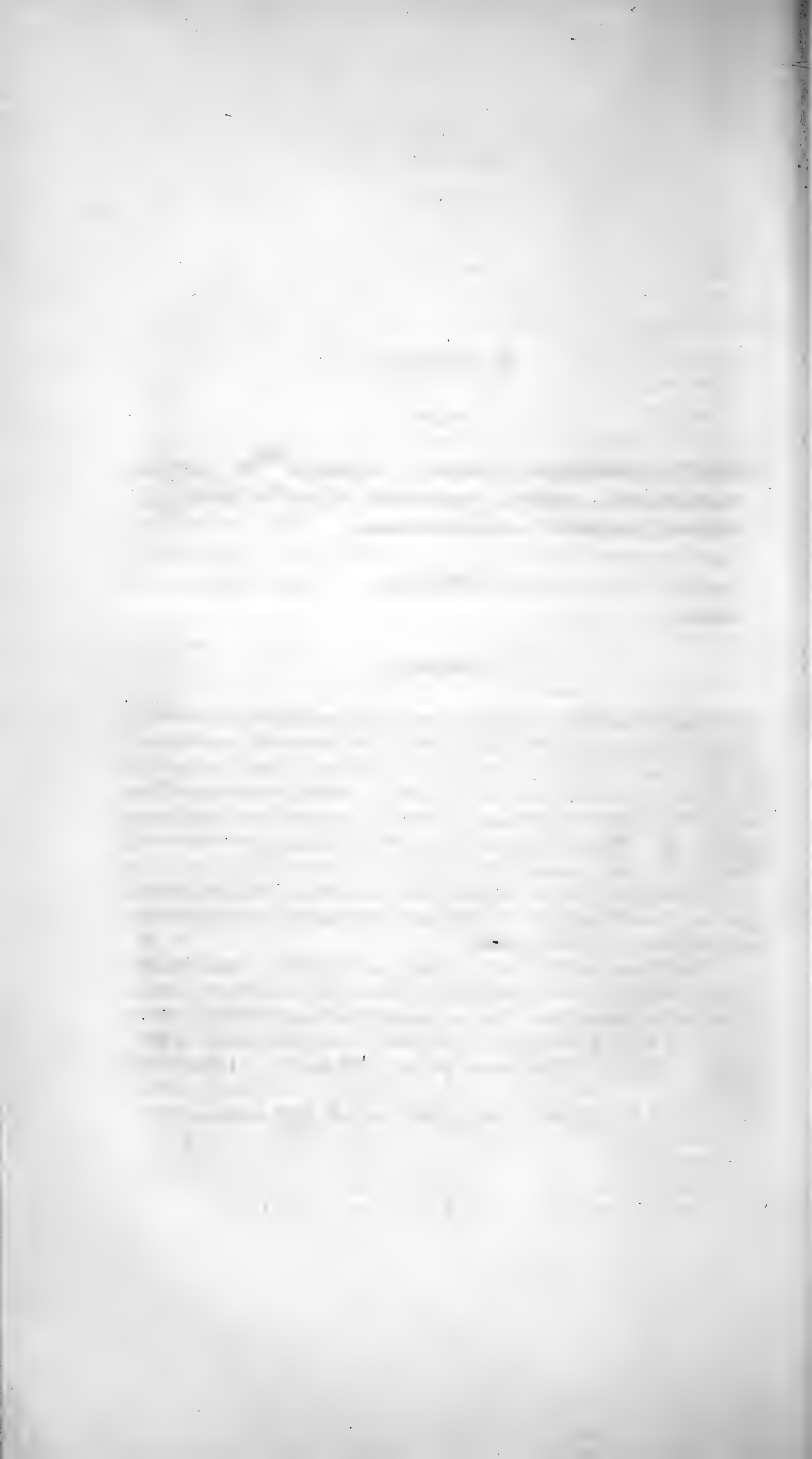


An interesting new Genus of bivalves which should be placed near to *Amphidesma*. It is remarkable for the dissimilarity of the hinge of the two valves, one having a strong lateral tooth on each side of the ligament and the other being entirely destitute of lateral teeth. Having only met with a single small West Indian species we could not venture to consider this Genus as established, until Mr. Cuming showed us several species in his rich collection of South American and Pacific shells, one of which is sufficiently large to show the characters distinctly.

The *Cumingia* are inequilateral, equivalve bivalves, with the anterior side rounded and the posterior rather acuminate. A single small anterior cardinal tooth is observable in each valve: and there is one strong lateral tooth on each side of the hinge in one valve, but no lateral tooth in the other valve; the ligament is internal and affixed to a somewhat spoon-shaped pit in each valve. The muscular impressions are two in each valve, they are lateral and distant, that which is anterior is irregular and oblong; the posterior is rounded. There is a very large sinus in the muscular impression of the mantle.

The shells of this Genus are marine, they are found in the sand in the fissures of rocks, and as far as we yet know they are tropical. Not known in a fossil state.

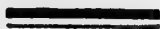




## RISOA.



**TESTA** univalvis, libera, oblonga vel turrita, acuminata, parva, aperturâ suborbiculari, integrâ, supernè subacuminatâ, infra subeffusâ, peritremate incrassato non reflexo, prope columellæ basin subemarginato. Operculum corneum.



A Genus consisting entirely, as far as we know of minute shells, the largest of which does not exceed an inch in length, and very few of which attain to half that size. It appears to us to be most nearly related to *Scalaria* from which it differs principally in the peritreme not being reflected. There are many species, which vary from an oblong, to an acuminate turritid form. All we have met with are littoral shells, and several species abound on our own shores. We do not remember to have ever met with any fossil species.

Shell univalve, free, oblong or turritid, acuminate, small, with a nearly orbicular, entire aperture, which is somewhat acuminate at its upper part and slightly effuse at the lower, peritreme thickened, not reflected, with a slight notch at the base of the columella. Operculum horny.

We have given representations of four species.

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## PLAGIOSTOMA.



*Lluyd.*



**TESTA** inæquilateralis, subæquivalvis, subaurita altitudine longitudinem plerumque superante; sulcis vel striis ab umbone ad marginem ventralem decurrentibus; lineâ cardinali in alterâ valvâ rectiusculâ, in alterâ plus minusve angulosâ; valvis clausis aperturam trigonam cardinalem efformante: umbones remotiusculi: cardo edentulus.



A remarkable Genus of Bivalves only known in a fossil state; it is nearly related to *Lima*, to which indeed some Naturalists would unite it. We have already stated our reason for thinking it distinct; although we are decidedly of opinion that it must be arranged close to it in the family of the Pectinidæ. This Genus which was established by Lluyd who named it,\* from the singular appearance of the hinge when seen in a particular direction, is of some importance to Geologists, inasmuch as the various species are characteristic of the various beds of Limestone from the Carboniferous Limestone up to the Chalk, abounding in most of the intermediate oolitic beds: the typical species named *giganteum* being found in great profusion in the Lias, and the *spinosum* being almost as frequent in the upper Chalk. The descriptions and figures of many species may be consulted in Sowerby's Mineral Conchology of Great Britain, where the localities and the bed to which each is peculiar are pointed out.

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\* Plagiostoma signifies "mouth awry."

## PLAGIOSTOMA.

It appears probable that when living the Plagiostomata were affixed by a byssus fixed to the animal, and passing through the anterior part of the shell, which is usually rather open.

The Plagiostomata are inequilateral, slightly inequivalve, oblique shells, with small ears; they are for the most part rather higher than they are long, and they are covered with grooves or striæ diverging from the umbones and passing to the ventral margin. In one species the ribs between these grooves are here and there ornamented with a longer or shorter spine.

## PANOPÆA.



**TESTA** ovalis, æquivalvis, inæquilateralis, utrinque hians, præcipuè ad extremitatem posticam; *dente cardinali* in utrâque valvâ unico, acuto; *impressionibus muscularibus* duabus, distantibus; *impressione musculari* pallii sinu maximo; *ligamento* magno, externo, *fulcro* maximo.



THIS Genus, which belongs to the family of Solenaceæ, is remarkable for the acute-pointed tooth in the hinge of each valve, and for the very large fulcrum to which the ligament is fixed. Its species, as far as are already known, are very few, not more than four or five, of which two or three are recent and one or two fossil. The principal and well known recent species is found in the Mediterranean; a second has existed in our own collection for many years, it was sent to the late G. Humphrey from New South Wales; and we have been informed that another has been dredged at Scarborough. The fossil species belong to the tertiary beds. Though not at all agreeing with the characters of that Genus, the only species known to Linnæus was placed with *Mya*; probably on account of its external resemblance; it will however easily be perceived that the two Genera are very distinct, the Panopæa having a sharp-pointed tooth in each valve, and an external ligament attached to a large fulcrum externally, while the *Mya* has a large, broad and blunt tooth in only one valve, and an *internal* ligament attached to that tooth.

Shell oval, equivalve, inequilateral, gaping at both ends, but principally at the posterior; with a single acute, cardinal tooth in each valve; muscular impressions two, distant; muscular impression of the mantle with a large sinus; ligament large, external, affixed to a very large and prominent fulcrum.

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## PULVINITES.



*Defr.*



**TESTA** bivalvis, inæquivalvis, inæquilateralis, compressa, tenuis, latere antico paululùm hiantē; valvâ alterâ planatâ, alterâ concaviusculâ; cardine lineari, brevi, posticali, sulcis perpendicularibus diviso; *impressionibus muscularibus* duabus, parvis, infra cardinem positis, inferioresubcentrali, majore; ligamento interno, sulcis cardinalibus affixo?



NAMED from its resemblance to a little cushion, by De France. Being only known in a fossil state, it is difficult to assign to it its proper characters or to distinguish it from *Perna*, *Crenatula* and *Inoceramus*, to each of which it bears some resemblance. This curious fossil was discovered in Normandy by our friend De Gerville, in the bed of Baculite Limestone of Fresville near Valognes. It seems proper to give a representation of it here, in order to draw the attention of Naturalists, and rather to gain information, considering that at present we are so imperfectly acquainted with it.

Pulvinites is an inequivalve, and very inequilateral bivalve, which is compressed and thin; and the anterior side is somewhat gaping; one valve is nearly flat, the other slightly concave; the hinge is linear, short, and placed closely behind the umbones; and it is divided by perpendicular grooves. The muscular impressions are two, small, one of them very small and placed immediately below the hinge, the other placed lower down, is larger and nearly central. Not having seen the recent shell we can only suppose the ligament to be internal, and to be attached to the perpendicular grooves of the hinge. For the same reason we are not aware whether or not the shell be affixed by a byssus.





## GERVILLIA.



TESTA oblonga, subæquivalvis, inæquilateralis, valdè obliqua, cardine longiusculo, lineari, rectiusculo, fossulis dentibusque plurimis irregularibus, subtransversalibus, infra marginem dorsalem positis. Testa, nisi in statu fossili, omninò ignota, quare ligamentum byssusque non extant.



As far as we can judge from the fossil remains of a shell alone this may be regarded as an intermediate Genus, and might be arranged between *Avicula* and *Perna*; in its general form and external appearance it resembles the former, while its hinge is somewhat like that of the latter, though sufficiently different from it to enable us to point out without difficulty the peculiarities by which it may at once be known.

This is one of the few Genera of shells which appears to be quite extinct, although many species have occurred at various geological periods from the Lias upward, to the Baculite Limestone of Normandy, in which latter bed that species was first discovered, upon which the Genus has been established by our friend De Gerville, after whom Naturalists have named it.

Shell oblong, nearly equivalve, very inequilateral and oblique; hinge line rather long, linear, nearly straight, with many irregular, rather transverse little pits and teeth placed below the dorsal edge; the shell not being known in a recent state we are unable to describe the ligament, or to state whether or not it is adherent by a byssus, though there is good reason for presuming that it is. We judge it to have been marine from its associates.



## BELLEROPHON.



**TESTA** spiralis, involuta, crassa, utrinque umbilicata, ferè symmetrica, aperturâ maximâ, semilunatâ, dorso rotundato, obtusè bicarinato, inter carinas emarginato.



IN general external form like the *Nautilus*, but destitute of chambers and in its peculiar characters approaching nearly to *Argonauta*; this remarkable shell, only known in the oldest fossiliferous strata, should be placed next to the latter Genus, from which it differs only in two important particulars, namely, in its nearly globular form and in having a thick shell. It is the only fossil that bears any real resemblance to *Argonauta*; although many *Ammonites* have occasionally been regarded as fossil *Argonautæ*, merely on account of their resemblance in form to the *Paper Sailor*. That the animal which forms this shell must very closely have resembled that of the *Argonautæ*, and that both (whenever they may be discovered) will prove to be nearly like that of *Carinaria* we think there can be no doubt: we are, therefore, satisfied that neither can have been formed by a cephalopodous animal.

It may not be amiss to detail here the principal reasons we have for drawing the above-mentioned conclusions:

*Firstly.* The animals of all the testaceous mollusca are affixed to the interior part of their shell by one or more muscles.

*Secondly.* They are covered (beneath the epidermis, wherever an epidermis exist) with a mantle from which the testaceous matter is deposited; which mantle covers the animal within the shell.

*Thirdly.* The shell in all univalves covers the important viscera such as the liver, the ovaries, &c.

*Fourthly.* It is important to make the observation, that in spiral univalves, such parts of the mantle as cover the inmost portions of the animal, are always comparatively thinner than the other parts of the mantle which may be and

## BELLEROPHON.

are occasionally exposed without the shell, this has been shown even in the *Nautilus pompilius*; it will be no answer to this fact, as a reason that the *Ocythoë* is a parasite, to say that the *Nautilus* is a strong shell, and the *Argonaut* a very thin testaceous covering, because the same fact may be observed in the *Carinaria*, whose shell is even thinner than that of the *Argonaut*. It must also be kept in mind that the *Ocythoë* has the inferior part of its body covered with as thick a mantle as the superior.

*Fifthly.* In such of the Cephalopoda as possess anything resembling a shell, it is entirely internal and not placed outside the mantle, nor is it produced by testaceous secretion from that organ.

It is to be observed that in those cases where the shell is such as *Aplysia*, *Bullæa*, &c. it is really outside the mantle, being covered more or less completely by the edge of the mantle folding over it.

We conclude, therefore, for the above reasons that the *Ocythoë* usually found in the *Argonaut* is not the animal by which it has been formed, and moreover that the animal which forms the *Argonaut* is not a Cephalopod, for it is not affixed to the inside of the *Argonaut* by any muscle; the *Argonaut* has an external epidermis, wherefore there can be no doubt that its animal is also affixed to the shell by a muscle, which the *Ocythoë* cannot be.

*Bellerophon* has been described as a chambered shell, with a Siphon (like *Nautilus*); this has, however, been proved by DeFrance to be a great mistake; it really has nothing which can be compared to chambers or a siphuncle. It is a spiral, involute, thick shell, umbilicated on both sides and very nearly symmetrical; its aperture is very large, semilunate; the back of its shell is rounded, obtusely bicarinated, and there is a notch in the lip between the keels.

Only known in a fossil state and characteristic of the carboniferous Limestone, and the oldest secondary strata; in these it is frequently found changed to *Silex*.

## PALUDINA.



**TESTA** ovata vel oblonga, spirâ subturritâ, anfractibus rotundatis, lævibus, aperturâ ellipticâ, peritremate continuo, acutiusculo; operculo corneo, concentrico, nucleo sublaterali. Animal viviparum.



PLACED among the Helices by Linnean writers, but separated from them by later authors, for very sufficient reasons. A remarkable circumstance in the natural history of this Genus has brought it under the notice of numerous writers, some of whom have named it from that circumstance "VIVIPARA." It has also been called *Cyclostoma*, although it is in every respect perfectly distinct from that Genus.

The usual form of the species of this Genus varies from ovate to somewhat oblong, occasionally they are very short; the spire is for the most part somewhat turrit with rounded smooth volutions, but occasionally the spire is very low, and the volutions are more or less strongly keeled: the aperture is generally elliptical, slightly modified on the inner side by the gibbosity of the last volution; and somewhat acuminate at the upper part. The operculum is horny, with concentric lines of growth and a sublateral nucleus. The animal, in all the species we know, is viviparous, the shells being fully formed before they are ejected from the ovary. Such are the characters of the true *Paludinæ*, and by attention to them it will not be difficult to distinguish them from those other Genera to which they are most nearly allied, as *Cyclostoma*, *Valvata* and *Ampullaria*. From *Cyclostoma* and *Valvata* whose opercula are spiral they may at once be known by their having a concentric operculum; but from the *Ampullariæ* they are only to be distinguished by their

## PALUDINA.

general form, which we hesitate not to assert, can scarcely be considered a sufficient distinction; wherefore, upon mature deliberation we are now disposed to unite with Paludina all those shells which have hitherto been regarded as *Ampullariæ*, which have an horny operculum, retaining in Ampullaria only those whose operculum is testaceous. This will cause a great dismemberment of the Genus Ampullaria as now received, and consequently show, that we have been misled in uniting the *Planorbis Cornu-arietis* of Lamarck to Ampullaria when it ought to have been joined to Paludina. The two Genera must nevertheless be considered as very closely allied. The Paludinæ are all freshwater shells as far as we know, and they may be regarded as evidence of the fresh-water origin of the Petworth Marble which abounds with them. We believe none of them to be æstuary shells, but there are some species found in the æstuaries of New South Wales which have the general form and appearance of Paludinæ, but which differ however in the operculum, which in these is spiral, with few volutions, and approaches to that of the Neritæ; these are typified in what are commonly called the *upper marine formations* (that of Headon Hill being undoubtedly an æstuary formation) by various species peculiar to these formations, which have been variously placed by Conchologists, probably on account of their ignorance of the operculum, some having placed them with *Ampullaria*, others with *Natica*, &c. We have represented at fig. 5 and fig. 6 in our plate, a recent and fossil species of this remarkable connecting Genus in order that Geologists may have an opportunity of recognizing it.

Paludinæ are not peculiar to any climate, but are found in tropical as well as in temperate latitudes; the fossil species abound in a thin bed immediately above the upper freshwater bed at Headon Hill, also in the Petworth Marble. The Genus has been called *Vivipara* by some authors. We have several recent species in England and throughout Europe; others are abundantly produced in rivers, ponds, and lakes in the West India Islands, in South and North America, in China and other eastern countries.

## LIMAX.



**TESTA** subirregularis, subquadrata, planulata, calcareo-crystallina, nucleo postico, inconspicuo, dorso epidermide induto; spirâ nullâ.



THOUGH in this work we have generally confined our descriptions and figures to the shells of the Mollusca, in one instance we have represented the animal itself. In the present Genus we are compelled to do the same, because the shell is entirely hidden by the integuments of the animal.

Limax is a Genus of land shells, which are found enclosed under the scutellum over the thorax of some of the common Slugs. It is in general a rather irregular, flattish, subquadrate, crystalline, shelly piece; without any spiral elevation, and covered on the back with an epidermis, which usually extends beyond the edge nearly all around; its nucleus is posterior, and very slightly defined. In some species there is scarcely any shelly piece, and only a few calcareous grains in its place. The Limaces are common, they abound in drains, and under stones; and are frequently found buried in the ground at a considerable depth.



THE UNIVERSITY OF CHICAGO  
CHICAGO, ILLINOIS

TO THE HONORABLE SENATE  
OF THE UNIVERSITY OF CHICAGO

IN RESPONSE TO A RESOLUTION  
PASSED AT THE MEETING OF THE SENATE  
ON MAY 1, 1900

REPORT OF THE  
COMMISSIONERS OF THE BOARD OF EXAMINERS

Our Readers are requested to observe that the account of the Genus **PLACUNANOMIA** was entirely prepared by our kind friend W. J. Broderip, Esq., which we inadvertently forgot to acknowledge at the time. Notwithstanding this forgetfulness on our part, we are really thankful to that gentleman for his kindness.



## VENUS.



**TESTA** æquivalvis, inæquilateralis, subglobosa vel subovalis, extùs plerumque rugosa, nonnunquam lævis; margine clausâ; dentibus, in utrâque valvâ, plerumque tribus cardinalibus ab umbone divaricatis; *impressionibus muscularibus* duabus lateralibus, distantibus; *impresione musculari* pallii sinu mediocri; ligamento externo, nonnunquam ferè occultato.



THE beautiful Genus of Bivalves to which Linné gave the appropriate name of the Goddess of the Sea and of beauty, typical of their origin and of their elegant form and colouring has been deprived of many of its brightest ornaments by the unsparing hand of later writers, who have been induced to separate from it\* Cytherea, Pullastra, Megadesma, Astarte, and others, and it is probable that a more intimate acquaintance with their animals than we at present possess, would demonstrate the necessity of a further division. The differences, however, which we observe in the shells, are not of sufficient importance to authorize us to make any further separations. We can only endeavour to point out such divisions

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\* It is remarkable that the Conchologists who are not distinguished for scientific research, and who are so addicted to the Linnean System that they can give none other a fair trial, complain of the number of Genera established by Bruguière, Lamarck, Cuvier, &c.; they are perhaps not aware that Linné himself was in his time celebrated as a needless innovator, too fond of creating new Genera, i. e. *genus making*. These poor people know not what they talk about; the truth is that it is the exclusive province of Him who created us to create Genera, and Naturalists can only describe and point out their characteristics.

## VENUS.

of the Genus as appear to be most natural. We shall find that as in *Cytherea* the differences are principally in the number and position of the teeth and in the siphonal impression. The first and principal division of the Genus consists of those species which are of a subovate form and with the anterior side very much shorter than the posterior; these are mostly longitudinally grooved or lamellose on the outside, and they have three strong diverging hinge teeth in each valve, the two *anterior* of which are emarginate in one valve, and the two *posterior* in the other valve; in these the siphonal impression or sinus in the muscular impression of the mantle is of moderate size and rounded; *V. puerpera*, *V. reticulata*, *V. Corbis*, &c. belong to this division.

The *Venus flexuosa*, *V. Paphia*, &c. are the typical species of another division, whose form is somewhat heart-shaped; they are generally rather acuminate posteriorly and rounded anteriorly, and there is scarcely any sinus discernible in the pallial impression; two large and distinct diverging teeth in each valve, and one small tooth which is anterior in the right and posterior in the left valve. It is observable that Lamarck has placed one of these (the *V. flexuosa*) among his *Cythereæ*, and that he has omitted the other (*V. Paphia*) altogether.

A third division consists of such species as are nearly of the same form as the last, but are covered externally with thin distant lamellæ; in these the sinus of the pallial impression is very small, and acuminate anteriorly; there are three cardinal teeth in each valve, of which the central is large and thick, the others are small and thin, and the anterior is a little curved; the *V. lamellosa* and *V. Thiara* are of this division.

The fourth division contains *Venus Marica* and other related species, which are rough and more or less cancellated outside; in one valve the middle and posterior teeth are large, thick and emarginate, the anterior linear and thin; and in the left valve the anterior tooth is long, thick and linear, the middle tooth is thick and emarginate, and the posterior tooth small, linear, thin and scarcely discernible, the pallial sinus is moderate in size and rounded in front.

## VENUS.

The *V. Gnidia*, *V. Dombeyi*, and others form a fifth division; in one valve of these the posterior tooth is very large and thick, and the two anterior teeth small and placed near together, having just space enough to receive the thin lamellar anterior tooth of the left valve between them; in the left valve the middle tooth is thick and double, and the posterior is elongated and narrow; these are slightly lamellose, muricated or cancellated externally, and the siphonal impression is rather large and acuminate.

In all the above five divisions the *lunule* or heart shaped impression seen just below the beaks when the valves are closed is distinctly circumscribed by an impressed line. In the following this is not so.

We may next particularize those species which are nearly orbicular in form, with three diverging teeth in the hinge, a large pallial sinus acute at its anterior end, and a flat space immediately below the fulcrum to which the ligament is attached; the *V. Chinensis* may be regarded as the principal species of this division. The exterior surface of these is nearly smooth.

The following are the principal characters of some shells which may form a seventh division, viz., in the right valve the two anterior teeth are thin and lamellar and placed near together, receiving between them a similar anterior tooth of the other valve, and the posterior tooth is thin, lengthened and double; in the left valve the middle tooth is thick and large, and the posterior tooth very thin and linear: the shells of this division are of an ovate form and very thin, and the siphonal impression is large: we have represented one of them at fig. 9.

The eighth and last division may consist of such shells as are smooth outside, with a small rounded sinus in the pallial impression, in these there are three large and distinct teeth in the left valve; there are also three teeth in the right valve, the anterior tooth is however very small in this valve; these are a near approximation in appearance to many *Cythereæ*.

The *Veneres*, which are very numerous, are found in the sand and gravel of the floor of the sea, and they appear to belong to all countries and climates; we have

## VENUS.

several on our own shores. Many of them are very brilliantly coloured internally, one is remarkable for the orange colour of its teeth, another for a deep violet coloured stain, and another is of a fine orange colour; the lamellated and cancellated external surface of others is very beautiful. We have lately seen a most singular species in which the lunule forms a deep hollow depression as in the *Cardium retusum*, found at Madeira by the Rev. R. T. Lowe: this together with another nearly globular species (the *Venus rugosa*) shows a fourth tooth in one valve placed just beneath the lunule, and fitting into a corresponding hollow in the other valve, in this respect, though not otherwise approximating to *Cytherea*. Other species show slight differences in the shape and position of the teeth, and one, the *V. mercenaria*, has an elongated rough space behind the teeth and just below the fulcrum to which the ligament is attached. The last mentioned species has received its name (*Venus mercenaria*) from the circumstance of its being used as money, under the name of *Wampum* by the North American Indians.

In general form the *Veneres* may be described as orbicular or somewhat ovate, they are usually rounded at both ends, seldom slightly acuminate posteriorly. They are usually rough externally, with concentric lamellæ, and in general more or less cancellated. The beaks are prominent, and there is mostly a heart-shaped impression just below them. The teeth, as we have shown above, are variable, there are however three diverging teeth in each valve. Two muscular impressions which are lateral, distant, and somewhat orbicular are united by a pallial impression, which has for the most part a small sinus posteriorly. The ligament is external, though sometimes nearly hidden by the outer edge of the shell extending beyond it and almost covering it.

Fossils of this Genus do not appear to abound, though they are not very uncommon; they belong principally to the tertiary beds.

We have represented one species of each of the divisions named above.

## VALVATA.



**TESTA** univalvis, spiralis, spirâ discoïdeâ vel elevatiusculâ, anfractibus rotundatis; aperturâ circulari, peritremate continuo acuto; operculo corneo spirali, anfractibus numerosis, confertis.



FOUND only, as far as hitherto we have been able to learn, in ditches, lakes and other freshwaters in the northern hemisphere; Britain and other countries in Europe possess several species, and in North America some abound both in a recent and fossil state. Few species are known, all of which are small shells; they generally have much the appearance of *Planorbis* or *Cyclostomata*, from the former they may, however, easily be distinguished by their having a circular aperture; and from the latter, by their being freshwater, and not land shells. We have never met with any other fossil species than those of a very recent lacustrine formation in Canada, and another in a volcanic stone from Auvergne, which we have represented.

Shell univalve, spiral, spire discoidal or only slightly elevated, with rounded volutions; aperture circular, not modified by the last volution, peritreme acute, sharp edged, continuous; operculum horny, spiral, its volutions numerous and close-set.





## NODOSARIA.

Orthoceras and Nodosaria, *Lam.*

TESTA polythalamia, recta, septis numerosis, transversalibus, siphone centrali vel laterali perforatis.

THE differences between Lamarck's *Nodosaria* and *Orthoceras* are so slight that we do not hesitate to unite them together under the generic name of *Nodosaria*, and upon reference to Sander Rang's *Manuel des Mollusques* we find that other writers entertain the same opinion. It is to be particularly observed that the minute cephalopodous shells which Lamarck has called *Orthocerata* are quite distinct from the remarkable fossils to which that name is usually applied. We have also shown that these last are closely united to the *Belemnites*, from which we do not indeed think them properly separated, seeing that they really differ in no circumstance except the thickness or solidity of the lower part of the shell.

For the present Genus we use the appropriate name of *Nodosaria* in preference to *Orthoceras*, partly because we wish thereby to prevent confusion, and partly because we wish to leave Geologists in possession of the latter term, which is so well applied to the remarkable fossils which have usually borne it.

We admit the *Nodosariæ* without hesitation to a place among the polythalamous *Mollusca*, although we are entirely unacquainted with their animals, because we

## NODOSARIA.

recognize in them distinctly the characters of such shells as belong to the class of Cephalopoda; but we do not entertain the same confidence with respect to the numerous Genera of minute organized bodies (which have usually been arranged among the Cephalopods, and which Linneans class with Nautilus and Serpula) which abound in the sand of the sea shore; most of which appear to us to be very little understood, and many of which may be only the divided portions of other creatures or their ova. For these reasons we do not intend to enter upon the illustration of these microscopic beings in this work; if we should ever obtain distinct demonstrations of their nature, and it should otherwise appear desirable, we shall most probably give a short treatise especially devoted to them.

The *Nodosariæ* are straight, multilocular shells, divided by numerous transverse septa, which septa are perforated by a central or lateral siphuncle. They abound in the sand at Rimini, and in many other places, and are found fossil in the subappennine tertiary beds.

## PUPA.



**TESTA** oblongo-cylindracea, crassiuscula, anfractibus plurimis, plerumque transversim costellatis, aperturâ ellipticâ, plerumque dentatâ, infra rotundatâ, peritremate continuo, reflexo.



APPARENTLY a distinct Genus of land shells, related to *Bulinus* and *Clausilia*. Its species are numerous, and they seem to be common to all climates. Several minute species are found in Britain, and many are abundant in Europe, but the larger species belong to tropical countries. The name has been given from a general resemblance of some of the species to the pupa of some insects. The Pupæ are easily distinguishable from the *Clausiliæ* by the absence of the internal elastic appendage which is found affixed to the columella in that Genus, from which also it has its name. The fact of all the *Clausiliæ* being reverse shells cannot be regarded as a distinguishing character, because some of the Pupæ are usually reverse shells. There is much diversity in general form among the numerous species of the Genus Pupa, some being short and thick and very obtuse at the apex, others being of an oblong and somewhat cylindrical form, and others again very much elongated and acuminate. The Pupæ are for the most rather thick shells, with numerous volutions, which are often finely ribbed transversely; the aperture is generally elliptical, sometimes rather quadrate at the upper part, and rounded anteriorly. Peritreme continuous,

## PUPA.

slightly incrassated and reflected. A single tooth is frequently observable just within the upper part of the aperture. Some species have from three to eight teeth, placed immediately within the aperture, and very various in size and form. Others are decollated, i. e. subject to an accident which is neither peculiar to the Pupæ, nor to land shells, but to which several marine shells are equally liable; it consists in the falling off of the first formed volutions of the shell after the animal has arrived at its full growth. The young shells of several species of this Genus may very easily be and frequently have been taken for Trochi, their form when only three or four volutions are grown, being very like some Trochi.

We have represented such species as show the greatest variation in form that we have observed in the Genus.

## TRICHOTROPIS.\*



**TESTA** univalvis, turbinata, carinata, tenuis, aperturâ longitudinem spiræ superante, basi integrâ; columellâ ad basim obliquè truncatâ; labio externo tenuissimo, acuto. Epidermis cornea, super carinas testæ erinacea. Operculum corneum, parvum, lamellis ellipticis confertum, nucleo laterali.



A REMARKABLE Genus of univalve shells, belonging to the predaceous Pectinibranchia, established by Mr. Broderip and myself, and first described in the Zoological Journal, from specimens brought from the vicinity of Icy Cape by Lieut. Belcher in 1828. The animal in most particulars resembles a *Buccinum* as to its external form and characters, differing from it principally in having only a very small fold of the mantle to line the nearly obsolete canal of the shell. This and some other inequalities on the edge of the mantle, corresponding in position to the keels on the outside of the shell, constitute the whole of the differences observable between the soft parts of the animal.

The shell is turbinated and carinated externally; its aperture is wide but longitudinal, and it is rather longer than the spire; its base is entire, without any notch, but immediately below the obliquely truncated columella there is an indistinct canal. The whole shell is thin and delicate, its outer lip particularly so. Epidermis horny, forming

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\* From *θριξ* seta, and *τροπις* carina.

## TRICHOTROPIS.

numerous sharp-pointed, bristle-like processes on the edges of the carinæ outside the shell; very strong, and by its contraction in drying frequently breaking the edge of the lip. Operculum horny, much smaller than the aperture, composed of elliptical laminæ, its apex or nucleus lateral.

This Genus may be distinguished from those with which it has either been confounded or to which it may be nearly related, viz. *Turbo*, *Buccinum* and *Cancellaria*, by the following circumstances. From *Turbo* it may easily be known by its thin shell, its elliptical and not spiral operculum and by the absence of the ciliated lateral membranes which belong to the *Turbines*. From *Buccinum* it is distinguished not only by the discrepancies observable in the soft parts, but also by the want of a notch at the base of the aperture, and by the very indistinct canal. From *Cancellaria* it may be at once known by its being destitute of the oblique folds near the base of the columella; it appears however to be the type connecting the true *Buccina* with the *Cancellariæ*.

Three species only of this Genus have hitherto been noticed, two of which appear to be confined to the Northern Ocean; we have represented the *T. bicarinata* from Icy Cape; the *T. borealis* was brought from Melville Island and a single specimen of it has occurred at Oban in Argyleshire; we have named the third *T. unicarinata*, but are not acquainted with its locality.

## PURPURA.



TESTA ovata vel oblonga, crassa, spirâ plerumque brevi, nonnunquam subelongatâ; superficie externâ plerumque sulcatâ, granosâ, tuberculosâ aut spinoso-muricatâ; aperturâ plerumque magnâ, ovatâ, subexpansâ, labio externo plerumque crenato, margine acuto, intus dentato; anticè emarginato, canali brevi: columellâ planulatâ; operculo corneo, nucleo laterali, margine columellari tenuiore.



THE latest author who has written upon the *Purpuræ* is Duclos. It appears that he has ascertained from actual examination that many true *Purpuræ* are mixed up with the species of the Genus *Buccinum* and other genera by Lamarck in his *Hist. Nat. des Anim. sans vertèbres*, and Duclos, uniting all these together, has described 150 species which he considers as true *Purpuræ*, combining them under six sections of the Genus.\* The great similarity of those animals which he has had the opportunity of examining, and the exact resemblance of the opercula of numerous species has induced him to unite together some of which Lamarck had formed a distinct Genus, such for instance as *Concholepas*; some for which Lamarck had found a place with his *Tritons*, such as *Tr. undosus*,

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\* Messrs Quoy and Gaimard appear since to have adopted the views of M. Duclos, for they also refer *Buccinum undosum*, *Linn.* to *Purpura*, and denying the right of Lamarck's *Ricinulæ* to be dignified as a Genus, unite all its species to *Purpura*.



## PURPURA.

Lam. (*Buccinum undosum*, Linn.); he has made Lamarck's Genus *Ricinula* contribute nearly if not quite all its species, and *Columbella* several, to ornament this already too extensive and overgrown family. Some of the alterations thus made by Duclos we consider as improvements, others we cannot praise. The union of *Concholepas*, whose shell may always so easily be distinguished from all the *Purpuræ*, we cannot approve. *Triton undosus* of Lam. though certainly ill assorted when placed with *Triton*, does not appear to us to be more naturally associated with *Purpura*; it approaches nearer to *Columbella*, and we suggest the probability of its forming a well distinguished Genus in union with several other cognate species\*. We see no objection to the union of the Lamarckian *Ricinulæ* and some of his *Columbellæ* with *Purpura*, because we find a number of species which it would be difficult to refer to the one Genus or the other when regarded as distinct, but which are naturally associated when united under *Purpura*.

*Purpura* is a Genus of marine shells, which in common with several other pectinibranchous Gasteropoda produces a purple secretion, which under some circumstances has formerly been used for dying, and might perhaps still be employed advantageously for that purpose. The species are very numerous and belong to all temperate and tropical climates. Some are found on our own coasts. The ova are deposited in small coriaceous vessels of various shapes according to the species, each having a stem, by the base of which they are affixed to shells, stones and other submarine substances.

The *Purpuræ* are for the most part ovate or oblong shells, generally with a short spire, and most frequently grooved, granose or tubercular or spinose externally; their aperture is generally large, somewhat spreading and ovate, its outer lip is often crenated, and it is sharp-edged, also commonly toothed near the margin within: it is notched and has a short canal at its anterior or basal extremity: the columellar or inner lip is mostly flattened

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\* Since the above was written Mr. Gray has separated the last mentioned Shells from *Purpura*, under the generic appellation of *Pollia*.

## PURPURA.

and often internally rather sharp-edged. Operculum horny, with a lateral nucleus, thinnest on the edge nearest to the columella. A very variable, and in some species very strong and thick horny epidermis covers the outside.

The following are the characteristics of the six divisions of this Genus mentioned by Duclos, first, those which are transversely grooved, such as *P. succincta*, Lam. (*Buccinum Orbita*, nonnull,) secondly, those which are longitudinally ribbed, as *P. Nassatula*; thirdly, the scalariform, in which the volutions resemble a winding staircase; fourthly, those with numerous spinose tubercles on the outer surface, such as *P. Hippocastanum*, (which leads to *Ricinula*); fifthly, such as are granose outside, of which *P. Morus* (*Ricinula Morus*, Lam.) is an example; and lastly the *Bucciniform* of which Duclos cites the *P. cataracta* as characteristic.

*Purpura* appears to us to be related to *Murex*, *Buccinum* and *Trichotropis*; but it may be distinguished by its operculum in most cases, and by the peculiarities of its columella in others. We have already pointed out its distinguishing characters. To *Monoceros* also it bears considerable resemblance, indeed there are some species which have the peculiar horn which characterizes *Monoceros* according to Lamarck, and in other respects entirely resemble *Purpura*: we are rather disposed to think that the horn ought not to be regarded as a generic character, for we know that it is very variable; indeed we find a similar horn in some species of *Murex*, as well as in some *Turbinelli*, and there is a very handsome *Purpura*, which has been called *Monoceros grandis* which has a very distinct horn, but in all other respects is a true *Purpura*.

Fossil *Purpuræ* are very scarce, and as far as we know they all belong to the tertiary beds.



## NERITOPSIS.



**TESTA** obovata, spirâ brevi, anfractibus paucis, rapidè majoribus, superficie plerumque granosâ; aperturâ transversâ, suborbiculari, peritremate intus incrassato, margine acutiusculâ; columellâ prope medium latè emarginatâ.



A GENUS of marine shells of which several species are known, both recent and among the tertiary fossils. The principal species has been long known and described under the name of *Nerita cancellata* in Chemnitz, but Lamarck has placed it with *Sigaretus*. We have also given one of the fossil species among our *Neritæ*. It appears to belong to the same family as the *Naticæ* and *Neritæ*, but we are not aware of its having any operculum, although we are much disposed, judging from the peculiarities of the inner edges of the aperture, to believe that it has.

The species of this Genus are of an obovate form, with a very short spire consisting of not more than three or four volutions appearing to increase very rapidly in size, and approach in shape very nearly to that of many *Naticæ*, their external surface is however for the most part rough with transverse rows of grains. The aperture is entire, transverse, somewhat orbicular, its peritreme being thickened within and generally somewhat grooved and its outer edge rather sharp; on the columellar side however there is a broad, and as it were double, rounded edged notch rather before the middle, and it is in this peculiarity that it differs most materially from *Natica*, and

## NERITOPSIS.

by which it may be distinguished at once from it. We have never seen any epidermis: these shells do not appear to be vividly coloured.

We are not acquainted with the locality of the recent species which is represented in our plate; the Island of Vanikoro is however the native place of another recent species. Two fossil species are found at Bordeaux, one near Turin,\* and one in Normandy.

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\* This appears to have belonged to a bed of tertiary formation which has been subjected to volcanic action and in which the fossils have consequently been blackened.

## LOTTIA.



Gray.



TESTA patelliformis, plerumque depressiuscula, vertice antico, prope marginem anticam incumbente, nonnunquam ferè marginali : *impressione musculari* non symmetricâ, latere antico dextrali latiore : disco centrali interno plerumque fusco-vario.



A GENUS of patelliform shells scarcely distinguishable from *Patella* except by the characters of the animal. It has been named *Patelloides* by Quoy and Gaimard, who have given representations of several species with their animals in the voyage of the *Astrolabe*. Mr. Gray rightly judging that the name of *Patelloides* ought not to be retained, as being only fit for use as a specific appellation, has named it *Lottia*, under which name he has mentioned it in the *Philosophical Transactions*. We cannot help regretting that it should be necessary for us to adopt a name without signification, and only do so in this instance because we wish to avoid the greater evil of multiplying the generic appellations of the same object. This Genus is one of many which demonstrates the positive necessity of becoming acquainted with the molluscum itself, as well as with the shell which it forms, and which is indeed one of its most important parts. It is well known that in *Patella* the branchiæ extend from near the head in two symmetrical rows placed above the foot and between it and the mantle

## LOTTIA.

externally; in *Lottia* on the contrary the branchiæ form but a single row which is contained in a cavity over the neck of the animal, a part being perhaps occasionally protruded; and if sometimes entirely visible, they are then seen in form of a plumose appendage passing out of the cavity on the left side of the head. Easy however as it is to distinguish *Lottia* from *Patella* by the situation of the branchiæ in the animal, it is extremely difficult to distinguish it by the shell alone; we will endeavour to point out its most prominent characters.

In general form as we have already stated it is very much like *Patella*, though flatter and not so conical, its vertex which as in that Genus is anterior, is more nearly approximated to the anterior margin than it usually is in *Patella*; in some instances it is very nearly marginal. The edge of the shell varies according to the nature of the outer surface, if that be smooth the edge is sharp and free from notches or any other irregularity; if on the contrary that be grooved or striated the edge is more or less deeply or broadly notched. In this circumstance it does not differ from *Patella* in the least. The great difference in the branchia of the animal would have led us to suppose that some important difference might have been found in the muscular impressions, because as a general observation, the mollusca whose branchia are symmetrical produce in most respects symmetrical shells, and the muscular impressions also are symmetrical, and this is the case in *Patella*. The dissimilarity in the two sides of the muscular impression of *Lottia* is however, very slight, it being rather wider on the right side near the head than on the left. Mr. Gray thinks he has observed that in the *Lottia* the internal central disk is generally of a dark or varied colour.

As far as we know at present the species of this Genus are only found on the shores of the South American Continent and Islands, where however it is probable there are a great number; specimens of the same species vary greatly in form.

- Fig. 1. *Lottia gigantea*, Gray.  
2. ————*testudinaria*. *Patella testudinaria*, Auctorum.  
3. ————*radians*, *nobis*.  
4. ————*Antillarum*, *nobis*.

## CERITHIUM.



TESTA plerumque turrita, attenuata, spirâ anfractibus plurimis compositâ, plerumque extus plus minus rugosa, tuberculosa vel spinosa, rarò lævigata vel spiraliter sulcata; aperturâ subquadratâ, vel ellipticâ, peritremate plerumque subincrassato, nonnunquam latè reflexo; intus posticè ultimo anfractu modificato: columellâ arcuatâ, plicâ spirali anticâ marginem superiorem canalis sæpe reflexi efformante.



THE Lamarckian *Cerithia* consist of shells of various characters, belonging even to different families. Linné appears to have been right (accidentally) in placing the *Cerithium Telescopium* of Lamarck among his *Trochi*; for we think this does not belong to the Genus *Cerithium*;\* certain others also, which inhabit æstuaries and rivers, appear to be distinguished from *Cerithium* in several particulars, these which consist of Lamarck's *Cerithia muricatum*, *echinatum*, *Radula*, *lapidum*, *petricolum*, &c. have been named by Brongniart "*Potamides*" in French

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\* Since this was written an opportunity has been afforded of examining the Molluscum by which the *Cerithium Telescopium* is formed. The Rev. M. J. Berkeley who has dissected it, seems to entertain the opinion that it may be considered characteristic of the Genus *Cerithium*, and that it is very nearly allied to *Trochus*. It appears also that it does not belong to the family of predaceous *Trachelipodes*, since its stomach would indicate that its food is either vegetable, or if animal, from its complicated structure and the thickness of its coat in parts, something most probably of a crustaceous nature. See his account of it in the XXth part of the Zoological Journal.



## CERITHIUM.

and if separated would compose the Genus *Potamis* if expressed in Latin. They appear to be nearly related to *Melania* and *Melanopsis* or *Pirena*. These being excluded, we have reason to consider Lamarck's *Cerithium* as a perfectly natural Genus. The species are apparently related on one side to *Planaxis*, and on another to *Tereba*, from the former they may be distinguished by their canal (which *Planaxis* has not) and from the latter by the form of the columella and the reflection of the canal. From *Pirena* the *Cerithia* may be easily distinguished by the posterior part of their outer lip being entire. The *Cerithia* are usually much lengthened or turritid spiral univalves, consisting for the most part of numerous volutions, generally more or less tubercular or spinose or rough outside, seldom nearly smooth or spirally grooved. The aperture is subquadrate or elliptical, with a somewhat thickened peritreme, which is sometimes broadly reflected; upper part of the aperture modified within by the last volution; columella arched, with an acute spiral fold at its base forming the upper edge of its rather short, frequently reflected canal.

Numerous indeed are the species, both recent and fossil, which may properly be placed in this Genus, although very few of them belong either to our own or the European shores. There is however so much variation in the external rugosities of the shells that it is extremely difficult to ascertain what are to be considered as distinct species and what are merely varieties. There are several peculiarities of form to be observed among the *Cerithia*; we shall notice the most important.

1. With a very short spire, granular surface, nearly circular aperture and exceedingly short, not projecting canal. Fig. 1.

2. Decollated at its full growth and having a much dilated and reflected outer lip, ribbed longitudinally on the surface, with scarcely any canal, and a very circular aperture. Fig. 2.

3. Having a much dilated and reflected outer lip, continuing over the canal at the anterior extremity and joining itself to the end of the columella, so that the canal, which is not reflected forms a small, sharp-edged, circular aperture: these are ribbed externally and decussated. Fig. 3.

## CERITHIUM.

4. Having a very short canal and a prominent callosity at the posterior part of the inner lip. Fig. 4.

5. With a thickened but not reflected outer lip, scarcely any canal, and forming frequent varices. Fig. 5.

6. With a rugose exterior, a distinct callosity at the posterior part of the inner lip and a rather lengthened, nearly straight canal; one varix opposite to the aperture. Fig. 6.

7. With the outer lip scarcely thickened, while the inner lip is somewhat extended and thickened; a rather lengthened canal distinctly reflected; and frequently a fold at the centre of the columella. Fig. 7, 8.

8. With a short and very wide canal, equal in length on both sides, the outer lip somewhat dilated towards the anterior part, and a single row of tubercles externally. Fig. 9.

9. Potamis. Fig. 10.

Of each of the above peculiar forms we have represented a species.

Fig. 1. is *Cerithium breviculum*, *nobis*.

2. ————— *decollatum*

3. ————— *sulcatum*.

4. ————— *tuberculatum?*

5. ————— *varicosum*, *nobis*.

6. ————— *mutatum*.

7. ————— *Columna*, *nobis*.

8. ————— *Clava*, *Gray*.

9. ————— *pacificum*, *nobis*.

10. ————— *muricatum*.



## GLAUCONOME.



Gray.



TESTA oblongo-ovalis, tenuis, ventricosa, æquivalvis, inæquilateralis, antice rotundata, posticè subacuminata, epidermide viridi, tenui, corneâ induta: dentibus in utrâque valvâ tribus, posticis majoribus, valvæ dextralis medio, sinistralis postico bifidis: *impressionibus muscularibus duabus* in utrâque valvâ, anticâ marginali, oblongâ; posticâ subquadratâ: *impressione musculari pallii* sinu magno, anticè obtuso; ligamento externo oblongo.



A BIVALVE which, according to Mr. Gray, belongs to the family of the Solenaceæ, inhabiting some of the great rivers of the Continent of China. It was first described by Mr. Gray in his *Spicilegia Zoologica*, he has since obtained specimens with the animal preserved in spirits, and has favoured us with his notes, from which we have extracted the following description.

“ Animal ovate, elongate, the lobes of the mantle  
 “ united together, leaving only a linear slit in the front of  
 “ the ventral margin for the passage of the small compressed foot: behind furnished with a very long, thick,  
 “ compressed, retractile siphon, (as long as the shell when  
 “ contracted in spirits,) grooved along the centre of each  
 “ side, and slightly bifid at the end. Body oblong, ventricose, soft, ending in a small oblong compressed foot, (as  
 “ long as the slit in the mantle) in front. Lips triangular,

## GLAUCONOME.

“ broad, elongate, oblique, rather thick. Gill elongated,  
“ oblong, very thin, united together behind the end of the  
“ body.”

Shell oblong-oval, thin, rather ventricose, equivalve, inequilateral, margins close, anterior end rounded, posterior somewhat acuminate, covered with a green, horny and thin epidermis, which is inflected over the margin all round; hinge teeth in each valve three, the posterior larger, the middle tooth of the right valve and posterior of the left bifid; no lateral teeth; muscular impressions two in each valve, the anterior marginal, oblong, the posterior subquadrate; pallial impression with a large, broad and deep oblong sinus, obtuse at the anterior extremity; ligament external, oblong.

Only one species of this Genus is known, which Mr. Gray has named *Glauconome Chinensis*.

# GENERA OF RECENT AND FOSSIL SHELLS

By

JAMES SOWERBY

Vols. I. & II. Text and Plates.

London, Eng. 1821-1825.

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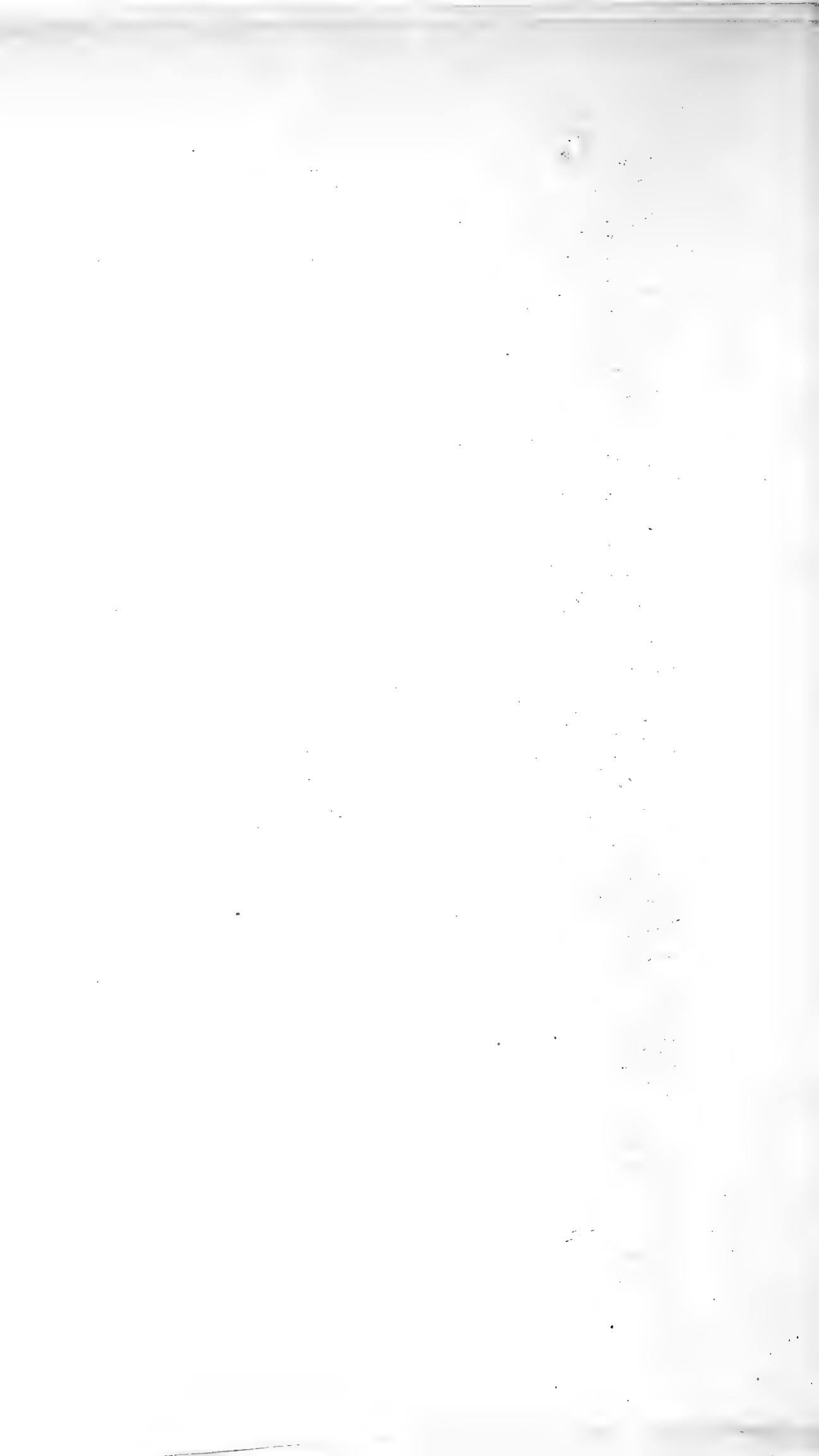
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